LITTLE DELL LAKE

SALT LAKE CITY STREAMS, UTAH

EMBANKMENT CRITERIA

AND

PERFORMANCE REPORT

August, 1994
Department of the Army
Sacramento District, Corps of Engineers
Sacrament, California

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The enclosed documents are hereby submitted for inclusion in DTIC's technical reports database. The following is a list of documents included in this shipment.

1. Little Dell Lake, Salt Lake City Streams, Utah, Embankment Criteria and Performance Report, August 1994
2. Caliente Creek Stream Group Investigation California, Draft Feasibility Report, June 1987
3. Fanchier Creek Dam Fresno, California, Embankment Criteria and Performance Report, July 1994
4. Sacramento Metropolitan Area California: Final Feasibility Report and Final Environmental Impact Statement/Final Environmental Impact Report, February 1992
5. Geologic and Seismologic Investigation, Hidden and Buchanan Dams, Hensley Lake and Eastman Lake, Fresno and Chowchilla Rivers, California, December 1988
6. Sacramento River Flood Control Project, California, Mid-Valley Area, Phase III, Design Memorandum, Volumes 1 and 2, August 1995
7. Reconnaissance Report Yolo Bypass, California, March 1992
8. Provo and Vicinity, Utah, General Investigation Reconnaissance Report, April 1997
9. Sacramento-San Joaquin Delta, California, Draft Feasibility Report and Draft Environmental Impact Statement, October 1982

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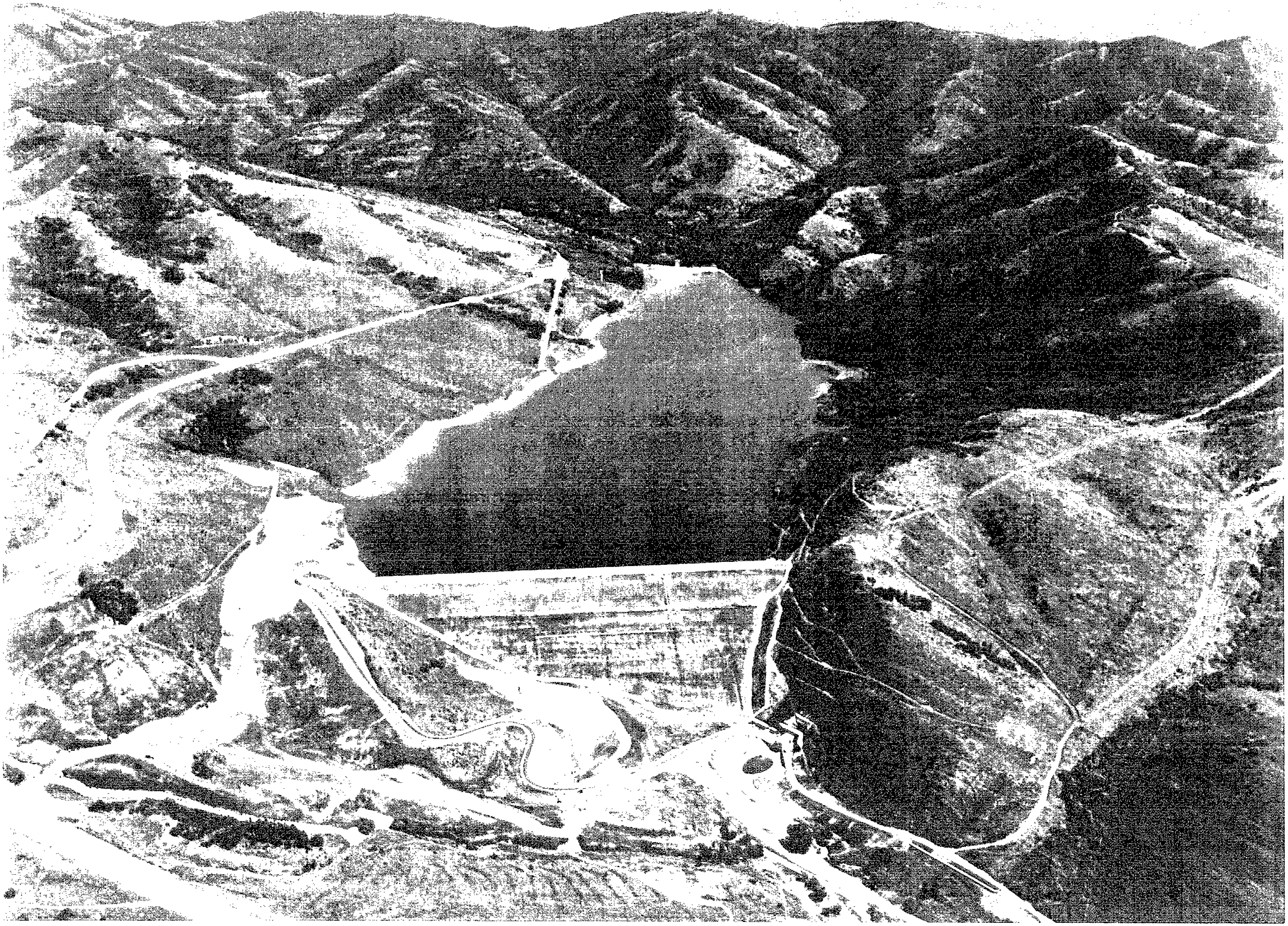

Little Dell, Salt Lake City Streams, Utah. Fall, 1993.
Photograph courtesy of : Don Green Photography, Inc. Salt Lake City, Utah

LITTLE DELL LAKE
SALT LAKE CITY STREAMS, UTAH
EMBANKMENT CRITERIA AND PERFORMANCE REPORT

PERTINENT DATA

1. GENERAL DATA

Name	Little Dell Lake
Stream	Dell Creek
County and State	Salt Lake County, Utah
Purpose	Flood Control and Water Supply

Drainage Area

Dell Creek above damsite	16.0 square miles
Parley's Creek above diversion	13.5 square miles
Parley's Creek above Mt. Dell Dam	41.0 square miles

Runoff, mean annual (1930-1968)

Dell Creek at damsite	5,600 acre-feet
Parley's Creek at diversion	5,700 acre-feet
Parley's Creek at Mt. Dell Dam	13,600 acre-feet

2. RESERVOIR DATA (NGVD)

Reservoir pool elevations (NGVD)

Inactive Pool	5,668.2 feet
Normal Maximum Operating Pool	5,785.0 feet
Gross pool at Spillway Crest	5,798.0 feet
Spillway design flood pool	5,810.0 feet

Reservoir areas Approximate

Inactive pool	50 acres
Normal Maximum Operating Pool	237 acres
Gross pool at Spillway Crest	249 acres
Spillway design flood pool	276 acres

PERTINENT DATA (Con't)

Reservoir Storage Capacity Appromimate

Inactive pool	1,000 acre-feet
Normal Maximum Operating Pool	17,500 acre-feet
Gross pool at Spillway Crest	20,500 acre-feet
Spillway design flood pool	23,000 acre-feet

Length of reservoir	1.2 miles

3. DAM

Type	Rolled, zoned earthfill
Crest Elevation (excluding overbuild)	5,813.0 feet, NGVD
Foundation Elevation - at dam axis	5,575.0 feet, NGVD
Maximum height above foundation at dam axis	238 feet
Freeboard above spillway design flood pool	3.0 feet
Crest Length (spillway not included)	1,745 feet
Crest Width	30 feet
Crest Overbuild (varies)	0 to 1.8 feet

Side Slopes

Downstream (Variable, depending on elevation)	1.75H to 1V to 2.0H to 1V from Crest El 5,813 to Gross Pool El 5,798. 3.0H to 1V from Gross Pool El 5,798 to the toe.
Upstream (Variable,depending on elevation)	1.75H to 1V to 2.0H to 1V from Crest El 5,813 to Gross Pool El 5,798. 3.0H to 1V from Gross Pool to El 5,735. 3.75H to 1V from El 5,735 to the toe.

PERTINENT DATA (Con't)

Total Embankment Volume	5,110,100 CY
Riprap, U/S Face of Dam	24-inch-thick layer of stone protection on a 9-inch-thick bedding layer from El 5663.0 feet. to the Crest.

4. DIKES — None

5. SPILLWAY

Type and location	Detached, ungated, broad-crest concrete sill and unlined channel on right abutment of dam.
Crest invert length	125 feet.
Crest elevation	5,798 feet, NGVD.
Discharge capacity at spillway design flood pool (elevation 5,810.0 feet)	16,500 cubic feet per second.
Exit Channel Erosion Protection	Five (5) buried concrete walls

6. FLOOD CONTROL AND WATER SUPPLY OUTLET WORKS

Type and Location

Single tunnel configuration through left abutment incorporating a submerged flood control intake structure;
Single concrete cut and cover conduit section transitioning into the upstream tunnel;
Single level submerged water quality intake located at the upstream portal;
A mid-tunnel emergency control chamber;
A downstream tunnel/adit section containing a single outlet pipe;
A downstream operational control structure;
A plunge pool type energy dissipator.

Upstream Configuration

Dual Conduits
(1) 6 feet 0-inch diameter circular flood control conduit.
(2) 2 feet 0-inch diameter circular water quality conduit.

PERTINENT DATA (Con't)

Downstream Configuration

Single Conduit
42" diameter steel pipe housed in a 9.5-foot-diameter modified, circular, concrete lined tunnel adit.

Intake Elevations (NGVD)

Flood control intake	5,625 feet
Water quality intake	5,675 feet

Gates and Valves

Flood control bulkhead gate (submerged, hydraulically actuated, located at intake)	One 7' -1-1/4" x 10'-2" steel.
Water quality bulkhead plate (submerged, diver installed, located at intake)	One 5'-0" x 5'-2" steel.
Flow regulating valves	Two 30" diameter jet flow gate valves.
Flow guard valves	Two 30" diameter ball valves.
Flood control isolation valve	One 42" diameter ball valve.
Water quality isolation valve	One 24" diameter ball valve.
Flow shut-off valve located at junction of Outlet Works and Parley's Creek diversion	One 42" diameter butter-fly valve.

Discharge Requirement (Flood Control)	300 c.f.s.
Discharge Requirement (Water supply)	46 c.f.s.

PERTINENT DATA (Con't)

7. DIVERSIONS

Parley's Creek

Diversion structure	Concrete weir.
Intake weir (El. 5,850 feet. NGVD)	15'W x 11'H x 20'L.
Spillway (El. 5,853 feet. NGVD)	26'W x 11'H x 16'L.
Conduit	48" and 60" diameter concrete cylinder and steel pipe.
Length	2.45 miles.
Design Capacity	90 c.f.s.

8. RECREATION FACILITIES — Deferred

9. CHANNEL IMPROVEMENT — None

10. HYDROELECTRIC POWER FACILITIES — None

LITTLE DELL LAKE PROJECT
SALT LAKE CITY STREAMS, UTAH
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EMBANKMENT CRITERIA

AND

PERFORMANCE REPORT

EMBANKMENT CRITERIA AND PERFORMANCE REPORT

1.0 PURPOSE AND SCOPE

This report fulfills the requirements of the Department of the Army, U. S. Army Corps of Engineers regulation titled, "Embankment Criteria and Performance Report" (ER 1110-2-1901) dated 31 December 1981. The purpose of the report is to provide a summary of significant design data, specification requirements, construction equipment, construction procedures, construction experiences, field control and record control test data, and to document embankment performance as determined by observations, inspections and instrumentation readings. The report provides the significant as-built embankment information needed by the operators and engineers to (1) familiarize themselves with the project, (2) evaluate and predict the embankment performance particularly in the event of unsatisfactory or abnormal behavior and (3) provide guidance for designing comparable future projects. Portions of this report may also be used to provide information for the embankment portion of Periodic Inspection Reports (ER 1110-2-100). Portions of this Embankment Criteria and Performance Report were prepared by the project Geotechnical (Embankment) Engineer, Project Geologist, the Instrumentation Engineer, and Sacramento District, Geotechnical Branch, Soil Design Section and Geology Section. The report was reviewed by the Sacramento District Geotechnical Branch, Soil Design Section and the Geology Section.

2.0 GENERAL

2.1 CONSTRUCTION AUTHORITY.

The Little Dell Lake project was authorized by the Flood Control Acts of 1960 and 1968. Senate Document No. 53, 90th Congress, is the original project document. The project was originally authorized for flood control, municipal water supply, recreation, and fish and wildlife enhancement. However, the project was modified to more adequately reflect existing needs. The modified project was reauthorized by Section 170 of the 1976 Water Resources Development Act (PL 94-587, 22 October 1976). A Post Authorization Change Notification Report (PAC) provided the authorization necessary to continue with detailed planning and engineering of the downsized project. Additionally, the authorized recreation purpose of the project was deferred and the proposed Emigration Creek Diversion facility was deleted from the project. Pursuant to the requirements of PL 99-88, a Local Cooperation Agreement (LCA) reflecting the reduced scope of the project was signed on 10 June 1986. This LCA addressed all applicable cost sharing and non-Federal responsibility issues contained in PL 99-88 and the Water Resources Development Act of 1986.

2.2 PROJECT LOCATION AND PURPOSE

The Little Dell Lake Project is located about eight (8) miles east of Salt Lake City in the western part of the Wasatch Mountains. The main dam is located on Dell Creek, a tributary to

Parleys Creek, which flows to the Jordan River and ultimately to the Great Salt Lake. The dam is located approximately 1.5 miles upstream of the existing Mountain Dell Reservoir. An auxiliary diversion structure is located on Parleys Creek below the confluence of Lamb's Creek. The diversion facility diverts flows to the Little Dell Reservoir through a 2.45-mile-long pipeline that terminates at the Downstream Operational Control Structure (DOCS). The project provides flood protection and water supply along with and some riparian mitigation and habitat enhancement. Flood protection will be provided for about 1500 acres of residential, commercial and industrial property in the 1300 South to 2700 South areas of Salt Lake and South Salt Lake. It is estimated the project will reduce nearly 90 percent of the potential flood damage in existing urbanized areas. The project will provide a supplemental annual water supply of about 2900 acre feet for municipal and industrial use in the Salt Lake area. Current projections indicate this additional water supply will be needed in the 1990's in order to support continued growth and economic development. The project location is shown on the General Location Map, Plate 1.

2.3 PROJECT DESCRIPTION

The main project features include the dam, outlet works, spillway and Parleys Creek Diversion. Project features are presented on Plate 2, Project Plan (General Layout).

2.3.1 Dam

The dam is a zoned rolled earthfill structure with a maximum height of about 238 feet above the foundation at the axis, a length of about 1,745 feet from Station 10+39 to 27+84, and a crest width of 30 feet at elevation 5813.0 feet. The Dam was constructed to elevation 5813 feet at the abutments with up to about 2-foot of overbuild at the maximum section. The downstream slope is a constant 3H to 1V from the toe to gross pool elevation 5798.0 feet. The upstream slope is 3.75H to 1V from the toe to a break in slope at elevation 5735 feet where the slope steepens to 3H to 1V. The portion of the dam from gross pool elevation, 5798.0 feet, to the crest has upstream and downstream slopes that vary from about 2.0H to 1V at the abutments, to about 1.75H to 1V at maximum section. The steeper slopes, toward the maximum section, were required because of the 0 to 2-foot overbuild incorporated in the top of dam. The embankment zones include an upstream shell of Random II and Random IV material, an impervious core, an inclined drain composed of a sand transition layer and a gravel drainage layer, a blanket or horizontal drain consisting of a gravel drainage layer protected above and below with sand transition layer and a downstream shell of Random I material. The optional Random III zone was not built. There is also a Random I buttress fill about 30 feet thick (max.) that covers the downstream toe and fills the gap between the dam and the primary access road fill. Also a wastefill about 25 feet thick (max.) was placed at the upstream toe filling the gap between the dam and the cut and cover backfill over the Outlet Works conduit. The upstream slope is protected with a 24-inch-thick sandstone riprap layer over a 9-inch-thick plus bedding layer. The downstream slope was seeded with native grasses. A core trench was excavated into bedrock and a three line grout curtain was constructed for the entire length of the dam, extending slightly beyond the embankment to abutment contacts at both abutments. The total volume of material placed in the dam was approximately 5,110,000 cubic yards. Refer to Table 1,

Embankment and Excavation Quantities, for a zone by zone quantity breakdown and a comparison of design versus as-built quantities. Refer to Plates 3 through 8 for the Embankment Plan, Stages, Profiles and representative as-built sections.

2.3.2 Spillway

The spillway is located on the right abutment in a natural draw. The centerline of the spillway channel is about 300 feet from the right end of the dam. The spillway is about 2150 feet long from the reservoir to its discharge point in a steep-sided ravine approximately 800 feet downstream of the dam. The spillway includes an excavated trapezoidal approach channel, a broad crested concrete control sill, an excavated trapezoidal exit channel, a natural draw protected with five concrete erosion control structures, and an excavated, unprotected trapezoidal training channel. The approach channel, sill and a portion of the exit channel are partially protected with sandstone riprap. The approach and exit channels have a bottom width of 125 feet with 2H to 1V side-lopes. The concrete sill is about 185 feet long, abutment to abutment, and is set into rock across the invert. The sill partially extends up the side slopes. The sill is located approximately 85 feet upstream of the dam axis. The training channel has a bottom width of 40 feet with 2H to 1V side slopes. The steepsided ravine that receives spillway flows in turn discharges in the vicinity of the Primary Access Road, Station 21+50, approximately 700 feet downstream of the dam.

2.3.3 Outlet Works

The outlet works include a flood control intake, a cut-and-cover conduit, a water quality intake, a tunnel with an emergency control chamber, a downstream operational control structure, a plunge pool and an exit channel. The outlet works transmits flows through the left abutment. The intersection of the dam axis and the outlet works alignment occurs at approximately Tunnel Station 17+36 and Dam Station 10+00. The flood control intake (Invert Elevation 5625.00 feet) is located about Dam Station 13+85, 885 feet upstream of the dam axis, 145 feet from the toe of the embankment. A 6-foot-diameter circular concrete cut-and-cover conduit extends from the back of the intake structure, Outlet Works Station 7+20, to the upstream portal, Station 10+40. The water quality intake port, (Elevation 5675.0 feet), is positioned 50 feet vertically above the low level flood control intake, just upstream of the portal face at Outlet Works Station 10+27. From the upstream portal to the emergency control chamber there is a 6-foot-diameter circular concrete tunnel. The water quality conduit is encased in the upstream tunnel liner. The emergency control chamber (ECC), located about 275 feet upstream of the dam axis, houses the water quality conduit and flood control conduit junction and associated isolation valves. From the ECC to the downstream portal at Station 26+27 the outlet works conduit consists of a 42-inch-diameter steel pipe in a 9.5-foot-diameter, modified circular concrete lined adit. The downstream operational control structure (DOCS), located at the portal, houses the normal operation control mechanisms. Flows from the reservoir are discharged directly into the energy dissipating, riprap lined plunge pool and then to the old Dell Creek channel via a short, riprap lined exit channel. The center of the plunge pool is located about Dam Station 13+35, 240 feet downstream from the visible toe of the dam.

2.3.4 Parleys Creek Diversion

The diversion facility diverts flows from Parleys Creek to Little Dell Lake. The combined spillway and intake diversion structure is located on Parleys Creek downstream of the confluence with Lamb's Creek. The spillway includes a free overflow weir and an impact type stilling basin. Upstream and downstream channel sections were designed to insure proper diversion during high streamflow. The intake includes primary and secondary sediment basins, a debris curtain wall, trash racks, a low flow bypass system, a pool drawdown system, and a flow control weir to insure proper main pipeline conditions. The diversion passes the initial 5 cubic feet per second flow in Parleys Creek through the diversion structure directly back into Parleys Creek. The main pipeline can transport a design flow of 90 cubic feet per second to the outlet works Downstream Operation Control Structure with a normal maximum reservoir operating pool elevation of 5785.0 feet. The 2.45 miles of pipeline consist of a combination of 60 and 48-inch-diameter conduits designed to allow flows to either enter the lake from the diversion or to be diverted directly into the outlet works plunge pool and exit channel.

2.4 CONTRACT ADMINISTRATION

The Little Dell Lake Dam and Appurtenances contract was administered by the U. S. Army Corps of Engineers, Sacramento District, Construction Operations Division, through the Utah Area Office located in Bountiful, Utah and the Little Dell Resident Office temporarily erected adjacent to the project. Mr. Paul M. Parsoneault was the Resident Engineer and Mr. Howard Aubertin was the Assistant Resident Engineer. The office was organized into a Quality Assurance and Acceptance Unit, a Field Unit, and an Administrative Unit. A materials testing laboratory/organization was included as a part of the Quality Assurance and Acceptance Unit. Refer to Table 2, Little Dell Resident Office Key Personnel, for an expanded list of key project personnel.

2.5 CONTRACTS

There were three Little Dell Lake project contracts, the Core Trench and Test Fills, Dam and Appurtenances, and Riparian Mitigation. Copies of these contracts are on file in the Office of the District Engineer, Sacramento District, Corps of Engineers, 1325 J Street, Sacramento, California. Pertinent contract information is listed in Table 3, Project Contracts. The Dam and Appurtenances contract was awarded to Clement Brothers Company and J. E. Starnes Co., a joint venture. Work commenced in May 1989 and was nearly complete in the fall of 1993. The dam was essentially complete in December 1992. Major subcontractors included Boyles Brothers for portal construction and grouting, Patrick Harrison Mining Company for the tunnel excavation, Construct Tech for the tunnel liner and other concrete work, and Johansen Construction Company and Rocky Mountain Fabrication for Parleys Creek pipeline. Refer to Table 4, Major Subcontractors.

3.0 CONSTRUCTION CHRONOLOGY

Construction of the Little Dell Project was initiated in June 1987 with the relocation of Utah State Highway 65 and major utilities. Excavation of the Core Trench to near final grade occurred during the spring and summer of 1988. During the Core Trench work in 1988, a Test Fill program was completed. Major work on the Dam and Appurtenances began in May 1989, and was concluded November 1993. In 1989 the contractor stripped the dam foundation, started the upstream and downstream portals, started the intake construction, excavated most of the left abutment, and began foundation grouting and tunneling. In 1990 the tunnel excavation and portal construction was completed, foundation grouting continued, Parleys Creek pipeline work started and embankment placement commenced. At the end of the 1990 construction season approximately 9 percent of the embankment had been placed. Most of this volume went into the upstream, Random II, cofferdam. Foundation grouting which had continued through the 1989-1990 winter was suspended during the 1990-1991 winter. In 1991 the tunnel liner was completed and water was diverted through the existing, partially completed outlet works, foundation grouting was completed, tunnel grouting was accomplished, and embankment placement continued. At the end of the 1991 construction season the embankment was approximately 42 percent complete. The contractor got a very early start in the 1992 construction season and was able to substantially complete the project by the end of the year, December 1992. The embankment was topped out in early October 1992, but riprap placement on the face of the dam continued into November 1992. Operations and maintenance responsibilities were transferred to the Local Sponsors on 26 March, 1993. Physical completion occurred November 1993. Some minor punchlist work continued past March 1994. Refer to Table 5, Construction Chronology, for a more detailed, complete record of the Dam and Appurtenances contract construction events and progress. Refer to the photographs for a pictorial summary of the embankment construction chronology.

4.0 REGIONAL GEOLOGY AND SEISMICITY

The project area, as shown on Plate 10, Regional Geology, is in the Wasatch Mountains of Northern Utah, a subdivision of the Middle Rocky Mountains. The Wasatch Front, a steep, rugged escarpment located about 6 miles west of the project area, is the result of major active faulting. This fault zone forms the boundary between major physiographic provinces, the Basin and Range province to the West and the Middle Rocky Mountains to the east. On a regional scale the area is steep and rugged with mountain peaks averaging about 10,000 feet in elevation. Locally, the topography is somewhat subdued because of the presence of younger, softer, and more erodible rock types. The major streams in the region flow westward in steepwalled valleys cutting through the mountain range across the geologic structure. Dell Creek flows southwestward, roughly paralleling the regional trend and joins Parleys Creek 1-1/4 miles downstream from the damsite.

The project area and surrounding region is underlain with sedimentary rocks ranging in age from Permain to Cretaceous. At the damsite, the sedimentary rocks are overlain by: Older

Alluvium consisting of terrace deposits; Younger Alluvium consisting primarily of stream and narrow flood-plain deposits; slopewash; and residual soil. The major regional structure is the Parley's Canyon syncline which is just north of the Uinta arch and shares a common limb. The central part of the syncline is a multiple fold that appears at the mountain front as two synclines, one in Parley's Canyon, the other in Emigration Canyon. The Little Mountain fault, a high angle reverse fault that parallels the regional trend, cuts the Parley's Canyon syncline and has caused it to ride up over the Emigration Canyon syncline in such a way as to cut out or truncate the intervening anticline. The fault is a major, though inactive, structure and may have several thousand feet of displacement. It cuts through the ridge between Emigration Canyon and Mountain Dell Canyon and comes within 3/4-mile of the damsite. The general trend of these major structures is about N 60° E. In the vicinity of the project, folding and faulting cause a repetition of some of the formations, but generally these features have little effect on rocks younger than Cretaceous. An angular unconformity separates the Frontier Formation and older rocks from the Wanship-Echo Canyon Formation and the Knight Conglomerate.

Intraformational movement has resulted in bedding plane shearing which follows the trend of the deformed beds within the major folds. As shown on the Regional Geology Map, Plate 10, the Geologic Map of the Embankment Foundation, Plate 12, and the Geologic Sections, Plates 14 through 18 respectively, faults with other orientations also exist and causes a repetition of some beds. Generally, the faulting resulted from compressional forces existing during the mountain building orogenies which ended about 25 million years before the present (b.p.). Since that time stresses have been mainly tensional. No tensional features have been observed in the area of the project; however, during the construction of the project, it was observed that reverse (hanging-wall-up) movement along bedding planes within the Cretaceous bedrock has affected overlying fluvial deposits within the borrow area. These features are the subject of an Office Report titled "The Age of Faults in the Reservoir Borrow Area - Little Dell Dam, Utah" which was prepared during the construction of the project. This report concluded that "Stratigraphically, therefore, the last fault movement occurred prior to 60,000 to 70,000 years b.p. (Fluvial Cycle 2) and most likely well before 100,000 years b.p. In accordance with Corps of Engineers' active (capable) fault criteria of displacement within the last 35,000 years, all three reservoir borrow area faults are judged not capable and, therefore, do not impact the design or construction of Little Dell Dam."

5.0 SITE GEOLOGY

5.1 GENERAL

This section describes the physical setting and geology at the major features of the dam. Later sections describe the foundation conditions encountered and the foundation preparation performed at each feature. For a detailed discussion of the Site Geology refer to the Foundation Report, Little Dell Lake, Salt Lake City Streams, Utah, U. S. Army Corps of Engineers, Sacramento District.

5.2 PHYSICAL SETTING

In the vicinity of the damsite the topography is more subdued than in most of the surrounding area. Hilltops are generally rounded and smooth with rock outcrops being sparse or absent. The valley floor at the damsite is relatively flat and about 700 feet wide. The valley widens rapidly upstream as the slopes on the right (northwest) side of the valley flatten considerably to form the reservoir basin. The right abutment and reservoir rim have gentle slope angles of 15 to 20 degrees; whereas, the left (southeast) side is much steeper with slopes averaging about 30 degrees.

5.3 GEOLOGIC UNITS

This section describes the geologic units encountered in the immediate area of the project. For descriptions of geologic materials of the region refer to the Regional Geology, Plate 10 and the Regional Geology, Description of Map Units, Plate 9.

5.3.1 Bedrock

Bedrock at the site consists of the Cretaceous age Kelvin and Frontier Formations. They are made up of interbedded marine sedimentary rock including claystone, siltstone, and sandstone with smaller amounts of conglomerate. Alteration of several ashy beds has resulted in weak, talcose layers oriented with the steeply dipping bedding. One bed of expansive claystone (montmorillonitic) was encountered near the base of the left abutment. The two formations are conformable and have similar engineering properties. The Kelvin Formation is typically maroon or brownish red; whereas, drab grays and tans are typical of the Frontier Formation. Both are generally moderately indurated but contain well indurated and poorly indurated layers.

5.3.2 Older Alluvium

In general, the Older Alluvium consists of nearly flat lying beds of fluvial material deposited in three distinct fluvial cycles during the Pleistocene epoch. Most of the Older Alluvium showed little evidence of induration, however, the oldest of the fluvial cycles was slightly to moderately indurated. For a more detailed description of the stratigraphy of the alluvium refer to the office report titled "The Age of Faults in the Reservoir Borrow Area - Little Dell Dam, Utah", Corps of Engineers (1993). In the older Alluvium deposits, gravelly, cobbley beds with boulders alternate with finer clayey beds. The attitude of the beds is similar to the slope of the valley surface, dipping gently downstream and toward the modern stream channel which flows near the base of the left abutment.

5.3.3 Younger Alluvium

At the damsite and reservoir the Younger Alluvium consists of Recent channel and overbank deposits. Unindurated sand, gravel, cobbles and boulders occur along the active channel.

Overbank deposits covered these coarser materials at low terraces along the channel in several locations. A denser, bouldery layer makes up the basal part of the Younger Alluvium immediately overlying bedrock. Wet organic overbank deposits covered portions of the surface except along several small active channels. The overbank deposits and loose or soft channel deposits were removed fr m the dam foundation and from required locations at the foundations of the outlet works structures.

5.3.4 Slopewash

The slopewash which covered most of the upper left abutment prior to excavation, consists primarily of sandy and silty clay with varying amounts of angular rock fragments ranging from sand to large boulder sizes. At the upper right abutment the slopewash consists of sandy clay with variable amounts of rounded rock fragments derived from the conglomerate bed at the top of the abutment. The near surface, organic or weak slopewash was removed from the foundation before approval was given for fill placement.

5.3.5 Alluvial Fans

At the left side of the reservoir, gravelly materials derived from the Frontier Formation were transported downhill in the small drainages and deposited as small alluvial fans at the base of the abutment. Fans along the right reservoir rim were of larger extent, less well defined, and in some cases had cut into the Older Alluvium. These materials were typically more variable and consisted of both gravel and clay lenses.

5.4 GEOLOGIC STRUCTURE

Structure at the damsite is largely controlled by the location and orientation of the northwest limb of the Parleys Creek Syncline. The dip of the beds ranges from near vertical at the right abutment to about 65 degrees at the left abutment. The average strike of bedding is about N23°E, which is roughly 62 degrees from the dam axis. As seen on the Geologic Map of the Embankment Foundation, Plate 12, and the Geologic Sections, Plates 14 through 18, numerous bedding plane shears occur throughout the bedrock. The bedding plane shearing occurred in the bedrock during the regional folding and mountain building which began during late Cretaceous time and ended about 25 million years ago. Frequently these shears occur along the altered, ashy beds and generally result in barriers to groundwater flow across bedding. Numerous shears of other orientations were mapped in the foundation and may affect the pattern of seepage through the foundation. Several bedrock faults at other orientations were also mapped in the embankment foundation. The more significant faults were named in relation to the project features and include the Left Abutment Fault, the Station 22 Fault, the Station 17 Fault and the Upstream Toe Fault. All of the shears and faults in the foundation were in the Cretaceous bedrock. No shears or faults were observed in the younger overlying materials.

5.5 LANDSLIDES

Two relic landslides were identified at the project. A small landslide was identified in the upper part of the downstream right abutment. This feature is shown on the Geologic Map of the Embankment Foundation, Plate 12, and will be discussed further in the foundation conditions section. Most of the slide was removed during foundation excavation and based on the size, orientation and physical properties of the remnant, it is anticipated there will be no adverse affects on the embankment. A larger relic landslide was identified along the left side of the reservoir, about 1500 feet upstream of the dam. The area was recognized as a landslide when the Contractor elected to borrow from the upper elevations of the reservoir borrow area. Numerous slide planes and springs were observed and it was realized that borrow excavation had removed part of this substantial slide. This borrowing from the slide toe may result in small scale slope failures where the excavated slope was left steeper than the previously existing slope. Large scale instability is not expected and will not affect the dam or appurtenant features. In the worst case, a small percent reduction in reservoir capacity would result from a slide into the reservoir. Six survey monuments, (BA-1 through BA-6) consisting of driven rebar were placed in the area above the excavated slope to monitor the slide.

5.6 GEOLOGY OF PROJECT FEATURES

5.6.1 Damsite

Most of the damsite, the downstream outlet works structures, and the spillway are underlain by the Kelvin Formation. The Frontier Formation makes up the bedrock at most of the left abutment and the upstream portions of the outlet works. At the upper abutments bedrock is thinly mantled with slopewash and residual soil. Prior to excavation for the project, alluvium of the modern stream covered bedrock near the stream channel. The modern stream generally flowed along the base of the left abutment. In the middle part of the valley and at the lower right abutment, older fluvial deposits (Older Alluvium) cover bedrock except where excavation was required for the project. The core trench was excavated into bedrock. Older Alluvium also occurs as discontinuous lenses at the lower left abutment.

5.6.2 Outlet Works

Alluvium covers bedrock at the Outlet Works Intake Structure and along most the Cut-and-Cover Conduit. Bedrock was exposed at the downstream portion of the cut and cover conduit where alluvium, slopewash and residual soil were removed. Portal excavations encountered slopewash and residual soil at the higher elevations, then lenses of Older Alluvium and recent alluvium and eventually bedrock at the lower elevations. The tunnel and Emergency Control Chamber (ECC) were excavated through the Kelvin and Frontier Formations. The Downstream Operational Control Structure (DOCS), and plunge pool wing walls were founded on Younger Alluvium and the Kelvin Formation. The plunge pool was excavated through Younger Alluvium and into the Kelvin Formation.

5.6.3 Spillway

The Kelvin Formation is covered by residual soil and slopewash at the spillway saddle and by Older Alluvium at the discharge channel.

5.6.4 Reservoir Borrow Area

Prior to excavation in the reservoir borrow area, the gently sloping broad valley was covered with fluvial material. Almost all of the Younger Alluvium near the stream channel was removed for use as borrow material for the dam embankment. Much of the Older Alluvium covering the right side of the valley was also removed and used as the primary borrow material for the dam embankment. This excavation exposed bedrock of the Frontier Formation over much of the reservoir bottom. Recent alluvial fan deposits along the reservoir rims were also used for borrow. The Frontier Formation makes up the steep left rim. The right rim is made up predominantly of Older Alluvium and alluvial fans. Smaller areas of the Kelvin and Frontier Formations were exposed by excavation at some location in the downstream part of the right reservoir rim.

6.0 FOUNDATION CONDITIONS, TREATMENT AND APPROVAL

6.1 GENERAL

This section describes the foundation conditions on which the dam was constructed. Excavation and foundation treatment are discussed, as well as groundwater and dewatering. Geologic mapping and foundation approval procedures are described. Specific information is shown on the geologic maps and sections, Plates 11 through 18.

6.1.1 Geologic Mapping

The majority of the geologic mapping was performed with a transit and stadia rod and with a total station equipped with an electronic distance measuring device (EDM). A sketch was made by the geologist in the field and points were surveyed at representative locations. The instrument man recorded the point numbers and the azimuth and slope distance. This information was later entered into a Compaq 286 computer at the Resident Office, and plots of the points were generated by the computer and a Hewlett-Packard 7550A graphics plotter. Software was written for this purpose by John Roadifer, a geological engineer and computer programmer assigned to the Resident Office. The geologist used the field sketch and computer plot to complete the map. Some areas were mapped using tape and Brunton compass methods.

6.1.2 Foundation Approval

A formal foundation approval procedure was developed early on in the project. It was established that all foundation required approval by the Resident Office geotechnical staff,

as delegated by the Resident Engineer, before embankment or concrete could be placed. Generally the Project Geologist and Embankment Engineer/Geotechnical Engineer jointly inspected and approved foundations. In their absence a staff Geological Engineer performed this function. Initially the Contractor's QC Chief provided a map of the areas requiring approval, then accompanied the Corps Geotechnical staff on an inspection. If deficiencies were noted, the Contractor was required to correct them and request another inspection. The process later evolved to where the Contractor's QC/foreman marked out the area requiring approval with red paint. After the area was inspected and approved, the Project Geologist or Geotechnical Engineer sprayed green paint adjacent to the red paint to indicate approval. The approval boundaries were then surveyed by the Corps. Later, the Contractor surveyed the boundaries and provided the data to the Government. Approval was given only after the area was mapped, photographed, adequately treated and prepared.

6.2 DAM SITE

Foundation conditions and thus treatment and preparation varied considerably in different areas of the dam. Much more work was required at the core trench invert foundation than at the upstream and downstream shell foundations.

6.2.1 Core Trench

6.2.1.1 Excavation.

The core trench was excavated in two main phases: 1) the Core Trench Contract (Summer of 1988), and 2) the main Dam and Appurtenances Contract (1989 thru 1992). The bulk of the excavation was accomplished under the Core Trench Contract during which excavation removed the overburden and generally continued several feet into bedrock. The purpose of the 1988 contract was to provide a surface suitable for inspection by the dam design team and by prospective bidders for the following Main Contract. Excavation cut off pervious alluvial beds and generally provided a surface adequate for installing surface pipes (nipples) for the foundation grouting. Some areas, primarily at the left abutment, could not be excavated to specified grade using conventional excavating equipment. Excavation to grade in these more resistant rock areas was deferred until the Dam and Appurtenances Contract.

Much of the exposed foundation rock deteriorated severely during the winter (1988-1989) after the Core Trench Contract and before the Main Contract. Excavation in the core trench under the Main Contract consisted of 1) removing deteriorated foundation material, 2) removing muck which had collected in the lower parts of the foundation, 3) blasting more resistant rock and 4) removing "ungrouted" foundation materials in softer rock zones where longer nipples were used, to approximately the grout nipple tip elevation. Excavation occurred before, during and after preliminary cleanup and after grouting but before final cleanup. Variable length grout nipples were installed depending on rock type and hardness and location of beds.

Some of the initially resistant areas which remained high after the Core Trench Contract, deteriorated during the winter and were excavated using conventional equipment. In the remaining more resistant rock areas, blasting was required to excavate thicknesses ranging up to 12 feet (as measured perpendicular to the final surface). On the left abutment an uneven surface remained in the blasted areas and in other reaches of hard blocky rock. Blasting was not permitted after grouting. Shaping of the resulting irregularities and overhangs was generally accomplished by breaking off the corners and overhangs with conventional excavating equipment, but numerous concrete fillets were required to correct the irregularities and overhangs on the left abutment.

After grouting, the deeper grout nipples were removed as the softer foundation material was excavated to approximately the elevation of the bottom (tip) of the nipples. This "deeper" excavating was accomplished over most of the core trench foundation to the right of Station 16+00. Harder rock required shallower nipples which were cut off at ground surface and backfilled with grout or mortar. Excavation at hard rock locations was required only to remove shallow deteriorated material and for shaping. Excavation was accomplished with trackhoes on the left abutment except for several small areas where resistant beds required ripping with D8 and D9 dozers. In the area between about Station 18+00 and 20+00, and at more localized locations throughout the core trench, final excavation was not advanced the full depth of the nipples. As the depth of the excavation increased, the rock in these areas became increasingly resistant. Heavy ripping or blasting would have been needed to excavate to the nipple tip elevation. Therefore, the requirement to excavate to the full nipple depth was relaxed to prevent damage to the grouted foundation below finished grade. The Contractor was directed to stop using heavy rippers when the excavation was generally within 12 to 18 inches of specified or required final grade. Close inspection of the foundation revealed that all significant open fractures had been grouted in areas left above design grade.

6.2.1.2 Foundation Grouting

The foundation grout curtain generally consists of three grout lines, 2.5 feet apart, at 10 to 15 feet upstream of the dam axis. Individual grout holes were drilled at angles ranging from 40 to 90 degrees from the horizontal to cross the steeply dipping bedding and provide additional coverage, particularly in the vicinity of the Outlet Works tunnel. The upstream and downstream grout line holes were drilled about 75 feet deep. The center grout line holes were drilled 150 feet deep in most areas and approximately 220 feet deep in the vicinity of the tunnel. Each hole was divided into three zones (0 to 25 feet, 25 to 75 feet and 75 to 150 feet or more). The grout consisted of a mixture of Portland cement, water and bentonite. Sand was rarely used. The Project Geologist set the split-spacing criteria and evaluated closure on the basis of grout take. The variable geologic conditions caused highly variable grout takes. The following summarizes in general terms the foundation grouting:

1) Closure was attained on all three grout lines in Zone I and Zone II with few exceptions.

2) Zone II and Zone III at the upper left abutment consistently took larger quantities of grout and required frequent staging. The left abutment, in general, had the highest grout takes of the entire grout curtain. One of the highest takes occurred in Hole A1305, (a total of 512.5 sacks for all zones).

3) Considering all zones, the right abutment, right of Station 23+00, took the least grout and has the tightest foundation.

4) Larger takes were common in the top two Zones (I and II) between Stations 19+25 and 23+00.

5) Between Stations 14+50 and 19+25, few holes had large grout takes in the top two Zones (I & II) but substantial takes occurred in Zone III.

6) The harder sandstone and conglomerate beds took the most grout. In areas where siltstone, claystone and altered beds predominate, grout takes were lower.

7) Incidents of grout surface leaks were conspicuously higher in the valley bottom near the modern stream location.

8) Approximately 74,526 total linear feet of grout hole was drilled. About 27,856 sacks of cement were injected into the foundation. The average grout take was approximately 0.37 sacks per foot of drilled hole. In comparison, average grout takes on the center (C) grout line in Zones I and II ranged from 0.03 to 0.12-sack per foot.

6.2.1.3 Foundation Materials

Refer to the Geologic Map of the Embankment Foundation, Plate 12, and the Geologic Sections, Plates 14 through 18, for details of the foundation geology. The core trench was excavated through the overburden and generally several feet into rock in order to cut off the granular alluvium and to found the impervious core on bedrock. Bedrock of the Kelvin and Frontier Formations was exposed throughout the bottom of the core trench. The bedrock consists of interbedded marine sedimentary claystone, siltstone, sandstone, and conglomerate with a few altered zones and one montmorillonite bed. The sandstone, siltstone and conglomerate beds of the Kelvin and Frontier Formations are generally moderately soft to very hard and provide a suitable foundation for the embankment. Although the montmorillonite bed, the claystone beds and the altered beds are very soft to moderately soft, the lateral extent across the core trench is small. The adjacent stronger beds will provide a bridging affect at these locations which will prevent foundation failures at the weaker beds. Except for a small area of slopewash near Station 13+00 at the upstream core trench cutslope, the left abutment cutslopes were entirely within bedrock. All of the Younger Alluvium was removed in the area of the modern stream channel between Station 14+00 and 16+00 such that the upstream and downstream core trench cut-slopes here were also entirely within bedrock. From about Station 16+00 to 21+00 substantial

thicknesses of Older Alluvium were exposed in the upstream and downstream core trench cut-slopes. To the right of Station 21+00 the core trench excavation gradually became more shallow as the Older Alluvium became thinner. Near Station 24+00, the Older Alluvium ends and between Station 24+00 and the end of dam at about Station 27+84 the upper core trench cut-slopes exposed overburden consisting of slopewash and residual soil.

The softer/weaker beds tend to be more plastic and deformable, closing fractures within the beds, particularly when compressed. These softer/weaker beds along with the shears, montmorillonite bed and altered beds should act as aquacludes (barriers to groundwater flow). Often the springs and seepage in the foundation occurred along shears. Aquacludes identified in the foundation cross the dam axis at Stations 13+60, 14+20, 15+40, 16+80, 23+60, 24+00 and 25+00. The siltstone beds and silty sandstone beds are relatively impervious and will retard flows, however open fractures were observed in these beds. The most probable seepage paths through the foundation will be located in the harder, less weathered blocky sandstones and conglomerates. Large open fractures (commonly 1-inch in width, occasionally up to 2-inches in width) were observed in some locations within the sandstone and conglomerate beds. Thus, the potential for significant seepage exists in ungrouted zones. However, the grout curtain installed just upstream of the dam axis should be highly effective. Grout records indicate most fractures to a depth of 75 feet below the foundation/core trench invert were essentially sealed. Between depths of 75 feet to generally 150 feet grouting was generally effective in sealing fractures as evidenced by the closure attained during the final split spaced foundation grouting. Nevertheless, because the grout holes were more widely spaced in this interval, it should be assumed some fractures were not grouted.

6.2.1.4 Groundwater and Dewatering

Numerous seeps and a few well defined springs were encountered in the core trench. The smaller seeps with low flows were treated by spreading dry Portland cement on the surface immediately before placing impervious core. Well defined springs with sustained flow were controlled with sumps and pumping. One spring that flowed consistently through 1989 and early 1990 at about Station 16+00, 10 feet downstream of the axis, had essentially dried up by the time leveling concrete was placed there in late 1990. At three other locations, larger sustained flows required the construction of sumps and pumping to control the flow until the surrounding embankment fill was at an elevation sufficient to overcome the pressure head of the springs. The sumps consisted of gravel filled pits with various arrangements of perforated pipes embedded within the gravel. A larger (18 to 48-inch) diameter pipe was used to draw down the water in the sump and the smaller (4 to 6-inch) diameter PVC pipes were usually installed as relief or grout ports to assure the gravel was adequately penetrated by grout when the sump was grouted at closure. The constructed sumps were located at the following locations, 1) at the base of the left abutment downstream of the dam axis at Station 13+95, 27 feet downstream, 2) along the Station 22 Fault Zone at Station 22+01, 39 feet upstream, and 3) above the Station 22 Fault Zone at Station 22+93, 20 feet upstream.

Significant seepage emerged along the fault in the upstream cutslope near Station 17+00.

Dry cement spread over the seep immediately before placing impervious fill was not totally effective in sealing off the seepage; partly because the geometry of the fault plane allowed the water to seep out of the cut-slope above each increment of fill placed. Due to the location on the upstream cut-slope the seep was not considered a threat to the integrity of the impervious core, but caused a problem for fill placement. Saturated fill was removed and replaced on several occasions before the seepage was covered by sufficient fill to prevent further saturation.

6.2.1.5 Foundation Preparation and Treatment

The core trench invert was thoroughly cleaned of all loose or objectionable material before the foundation was approved for fill or concrete placement. Generally high pressure air was used to clean the foundation after excavation to grade. In some areas of hard rock, water or a combination air-water method was used. Open joints wider than about 1/32-inch were filled with Portland cement and sand mortar. Joints filled with soft or erodible material were cleaned out a depth one to three times the joint width and backfilled with mortar. All significant overhangs were corrected either by placing formed concrete fillets or by removing the overhang by excavation. Concrete dental placements were used to improve the foundation where soft erodible material was encountered and removed.

Much of the foundation consisted of siltstone, sandstone and claystone layers which deteriorated after varying periods of exposure. Most of the softer rock air-slaked if not covered within hours. Some beds deteriorated very quickly, some in as short a time as 1-hour. When beds deteriorated due to exposure, the Contractor was required to prepare the foundation again. In most cases this meant using high pressure air nozzles to strip the deteriorated material from the foundation.

The worst foundation conditions encountered in the core trench were at the bottom of the left abutment, downstream of the dam axis at about Station 14+00. A significant spring emerged through large open fractures in a blocky sandstone bed at this location. Shearing and accelerated weathering along joints and fractures had caused significant deterioration of the rock. Problems with final cleanup occurred and mortaring of open joints proved to be inappropriate. Fractures separated the rock into small blocks which moved when wheel rolling the impervious core against the abutment. There was also concern that the loose blocks would readjust under the load of the embankment. Attempts to remove unsuitable material resulted in overexcavation without any appreciable improvement in foundation conditions. The final excavation extended to a depth of about 8 feet below the surrounding area.

The depression was eventually used as a sump to control the spring and later concrete was placed around the sump pipe as a dental placement. To further stabilize the foundation and protect the core, three substantial concrete fillets were placed in sequence as the fill rose in elevation. Each successive fillet overlapped and was partially founded on the preceding fillet. In the area around the fillets, the deeper, more open joints were filled with a 1:1 (water:cement) grout mix poured into them at the surface. Other fractures were mortared and another small fillet was placed just upstream of the 3-tiered fillets. Upstream of the axis the sandstone bed is softer

and intensely fractured. Concrete was also placed here because it was more efficient than attempting to mortar all the joints.

Several concrete fillets were used to correct overhangs in the harder rock beds on the left abutment. In several locations, large open fractures were observed in the rock and were filled with a 1:1 grout mix. The concrete fillets were formed so that the resulting sloped surfaces were no steeper than 70 degrees from horizontal. The fillets were not feathered out at the edges and for the most part the edges were greater than 6 inches thick. This treatment was usually required in the hard sandstone and conglomerate beds. Minor shaping of these very hard beds was done with jack hammers, backhoes and dozers, however they were difficult to shape with this equipment. Large backhoe-mounted pneumatic hammers were considered beyond the scope of the contract. Also, shaping was difficult because the major plane of weakness of the rock is along bedding which dips steeply into the left abutment. When attempting to shape the hard rock by breaking off overhangs, the rock commonly broke along a bedding plane higher up the abutment and created a higher overhang.

Foundation treatment was always adapted to the conditions encountered. Between approximately Stations 14+45 and 16+80 numerous depressions resulted from final excavation and cleanup activities. Several locations received dental and leveling concrete placements to improve foundation conditions and facilitate fill placement. Directed overexcavation of soft zones within hard sandstone beds required the placement of dental concrete at three locations between Stations 19+10 and 20+25 and at an isolated location at the downstream edge of core, Station 20+74. A thin (6-inch-wide), partially indurated, pebbly, sandstone bed crosses the dam axis at Station 20+45. The bed was uncharacteristically friable and porous. It was excavated to a depth of about 18 inches and backfilled with concrete. A grout nipple was placed directly into the bed but the grout take was minimal.

6.2.2 Upstream and Downstream Shells

6.2.2.1 Excavation

Foundation preparation began with stripping of the right abutment and streambed/valley sections and concurrent stripping and excavation of the left abutment. Stripping and excavation was accomplished with a combination of conventional excavation equipment including primarily dozers, scrapers and trackhoes. The initial stripping and excavation removed topsoil, organics and weaker near surface soil and weathered rock. Over most of the dam's abutment foundation the initial stripping and excavation took place so far in advance of fill placement additional stripping and excavation had to be performed as the embankment advanced. The incremental stripping and excavation to final grade was generally accomplished using trackhoes. Hand labor removed all loose rock and debris prior to final approval.

6.2.2.2 Foundation Materials

Left Abutment Downstream:

The downstream shell at the left abutment was founded on bedrock typical of the Kelvin and Frontier Formations. All overburden was removed so that seepage through the bedrock would have unimpeded access to the drain blanket. Bedrock at this location consisted of harder sandstone and conglomerate layers, interbedded with silty sandstones, siltstones and claystone beds. The sandstone and conglomerate beds contain open fractures and should provide good drainage of the abutment. A small patch of slopewash was left in place at about Station 13+70, between 300 and 460 feet downstream. It was not removed because excavation would have caused a steep or overhanging condition in the foundation which would have required substantial excavation to correct.

Left Abutment Upstream:

The upstream shell at the left abutment was founded on bedrock typical of the Frontier Formation, slopewash and a small lens of cobbly Older Alluvium. The slopewash consisted of grayish and yellowish-brown sandy clay with variable percentages of angular rock fragments. For the most part the rock fragments consisted of the harder sandstone typical of the Frontier Formation and ranged in size from gravel to large boulders. It was confirmed during construction that the slopewash would provide an adequate foundation for the upstream shell embankment. The foundation was thoroughly inspected before each increment of fill placement and weaker, softer materials were removed. The slopewash was relatively impervious, with the exception of thin layers close to hard rock outcrops where it contained a large percentage of rock fragments. The small Older Alluvium lens consists of hard, dense, and well rounded gravel and cobbles in a gray clayey sand matrix. The permeability of the Older Alluvial lens is probably greater than in the surrounding slopewash. Bedrock was exposed along much of the base of the left abutment, and over most of the foundation near the core trench. The bedrock encountered included interbedded sandstone, conglomerate, siltstone and claystone layers, typical of the Frontier Formation.

Bedding plane shearing and other faults were observed at numerous locations on the left abutment. All shearing was confined to the Cretaceous age bedrock. Two significant faults cross bedding in the upstream shell foundation and several other discontinuous faults cross bedding on the left abutment. The two significant faults were given the names: Left Abutment Fault and Upstream Toe Fault for purposes of discussion and identification during construction. The Upstream Toe Fault was first observed where bedrock was exposed at Station 12+35, 550 feet upstream. The fault trace was covered with alluvium in the valley bottom but a shear with a similar trend was observed in a dewatering ditch at Station 14+55, 680 feet upstream and is probably the same fault. The Left Abutment Fault roughly parallels the dam axis at about 100 to 150 feet upstream and dips downstream under the core trench. At the surface of the left abutment the fault exists as a narrow band about 1-foot-wide, where beds were offset along a broken rock zone. Substantial gouge did not extend to the surface. The Left Abutment Fault is a compressional feature which apparently ends in the montmorillonitic bed at Station 14+20, 120 feet upstream. Several faults of similar trends but smaller extent were mapped in the downstream

shell foundation.

Subsurface water flow, quantity and direction, in the left abutment foundation is strongly affected by the existing shear zones and faults. Where reservoir seepage has access to the surface trace of the Left Abutment Fault it will serve as a path for seepage to enter the foundation beneath the embankment upstream of the core trench. There will also be direct water access at high pools where the fault exists above the embankment within the reservoir. At this location high on the left abutment, significant seepage losses are not expected. Seepage through the Younger Alluvium left in place under the upstream shell will give indirect access to the fault via the open fractured conglomerate bed at the lower left abutment. Offset of bedding along the Upstream Toe Fault will probably retard seepage through bedrock on the left abutment.

Valley Section:

The valley/streambed section of the dam foundation is underlain by bedrock typical of the Frontier and Kelvin Formations and a relatively thin veneer of Younger Alluvium. The Younger Alluvium generally consists of coarse grained deposits of sand, gravel, cobbles and boulders with fines. Occasionally, small lenses or layers of finer grained soils (sand, silt or clay), are interbedded with the coarser deposits. As confirmed during construction, the basal portion of the alluvium provides an adequate foundation for the shells of the dam. In the upstream foundation, the pervious nature of the gravelly and cobbly alluvium provides access for seepage to the fractured rock in the foundation. For this reason the alluvium was completely removed and Random II fill was placed directly on bedrock in an area between Stations 14+00 and 16+00, extending to about 170 feet upstream of the axis.

Right Abutment Upstream:

Right of the valley section, between Stations 15+00 and 24+50, the embankment was founded primarily on Older Alluvium. Bedrock was exposed only at foundation level in the ravine extending upstream from Station 21+00 and in an area extending about 250 feet downstream from Station 16+75. The Older Alluvium under the upstream shell foundation was known to be the weakest of the foundation materials. This Older Alluvium consists of two fluvial cycles, each containing a coarse grained gravel layer (GC) overlain by a fine grained clay layer (CL). A coarse grained layer, the "basal unit", consisting of gravel, cobbles and boulders in a clayey sand matrix overlies bedrock. A clayey, fine grained "intermediate clay layer" (CL) overlies the basal unit. The "upper gravel layer" overlies the intermediate clay layer and the "upper clay layer" overlies the "upper gravel layer".

During construction it was confirmed that part of the upstream shell Older Alluvium foundation was a saturated and relatively weak fine grained clay (CL). An area between Stations 18+00 and 19+50 and between the upstream toe of the embankment and 250 feet upstream of the dam axis showed significantly higher deflections when proof rolled with loaded scrapers. Two test pits were dug in the area to investigate the possible benefits of removing all or part of the saturated upper clay layer. The material encountered was saturated and fine grained to the bottom of the pits at about 7 feet deep below grade at that time. Contract explorations indicated the shallowest coarse grained bed was at least 15 feet deep in the area. Pocket penetrometer tests

in the pits indicated unconfined shear strengths ranged from 0.65 to 1.25 tons per square foot (tsf), with most of the tests between 1.0 and 1.25 tsf. Engineering Division was consulted as to the best course of action. It was determined that substantial additional excavation was not warranted or practical, and that shallow, additional excavation would not significantly improve the foundation conditions. The area was scarified and the Contractor was directed to place Random II fill on the coarser side of the specified gradation band. Close inspection of the first lifts indicated adequate compaction was achieved. Additional instrumentation was installed in the foundation to monitor the performance of the foundation in this area. In general, although some deflections were recorded in the inclinometers during construction, the movement was less than the threshold values selected during design. Refer to the End of Construction Report on Project Instrumentation, Sacramento District 1993, for a more detailed discussion of the additional instrumentation and the results recorded. To the right of Station 24+50, the upstream shell is founded on slopewash and bedrock.

Right Abutment Downstream:

The middle part of the downstream shell, between Stations 17+00 and 22+50, was founded on firm Older Alluvium. Excavation of the ridge downstream of the core trench resulted in much of the upstream one-quarter of the downstream shell being placed on the dense basal unit of the Older Alluvium. Downstream of that area the majority of the shell was placed on the fine grained intermediate clay layer and the upper clay layer. Between Stations 17+00 and 19+00 at about 500 to 550 feet downstream of the axis, the basal coarse grained layer and the upper gravel bed appear to be connected. To the right of Station 22+50 the downstream shell was founded on a combination of bedrock, slopewash, and a relic landslide. The foundation in this area is relatively strong and incompressible.

6.2.2.3 Groundwater and Dewatering

Other than a minor seep which emerged at Station 18+60, 305 feet upstream, no groundwater springs were encountered up the right and left abutments. Several springs were encountered in the valley bottom and at the bottom of the left abutment. Five (5) sumps were constructed in the upstream shell foundation and six (6) were constructed in the downstream shell foundation. To construct the sumps, backhoe pits were excavated from 2 to 4 feet deep at the spring locations and gravel was installed around a perforated CMP in the excavation. Transition sand was placed over the gravel and a pump was installed inside the CMP. After the fill had been placed to a sufficient elevation to overcome the pressure head of the spring, the sump was backfilled. Grout was used to backfill the sumps under the upstream shell. Transition sand and Drainfill gravel were used to close out, i.e. backfill and cover, the sumps under the downstream shell. Gravel lined shallow ditches were used to collect water near sumps where seepage exited the foundation at more than one location. The seepage flowed to the sump along the gravel collectors. Care was taken to restrict the gravel collectors to short distances and generally have them oriented parallel to the dam axis so that long upstream to downstream seepage paths were not built into the foundation.

During the 1991 construction season seepage from the springs in the downstream

foundation was collected by the drain blanket. By the end of the year the base flow was measured at about 20 gpm, down from the estimated springtime flow of about 70 gpm. These flows are considered estimates because there were occasions when water from the sumps upstream of the core was pumped over the core and discharged into the drain blanket. Seepage from the Station 22 Fault, estimated at less than 2 gpm., was being drained to the downstream shell foundation above the area covered by the drain blanket. Seepage from the Station 17 Fault, estimated at less than 0.5-gpm, was being ponded and periodically pumped away. Water produced from the upstream toe sump was pumped into the Dell Creek diversion system and was not measured.

6.2.2.4 Foundation Treatment

Foundation treatment of the shell foundations consisted primarily of proof-rolling and compaction of the soil foundation and removal of loose rock and debris. Generally six (6) to eight (8) passes of the specified roller compactors were required. In the upstream foundation the alluvium was proof-rolled with a vibrating roller compactor before foundation approval was given. At the downstream foundation, the alluvium was proof-rolled to identify soft spots but was later scarified to minimize the "sealing" effects of rolling the foundation and to promote seepage from the alluvium into the drain blanket. Due to high moisture content, areas between Stations 16+00 and 17+00, and between 300 and 500 feet downstream required scarification and recompaction to improve the foundation before fill was placed. Where slopes were too steep for proof-rolling, the slopes were visually inspected and any unsatisfactory materials were removed from the foundation. Except at the soft area between Stations 18+00 and 19+50, upstream, the only other foundation treatment was the use of cobbly bridging layers at small isolated locations where the fine grained Older Alluvium was less stable.

The only special foundation treatment performed on the left abutment downstream shell foundation was in areas where large open fractures were observed at the surface. In numerous locations drain fill gravel was placed in and over the large fractures to assure that the Transition sand would not infiltrate into the foundation and be transported downstream. Unusual or special foundation treatment was not required on the downstream right abutment, including the area underlain by the relic slide. Nonetheless, the two exploratory trenches excavated through the slide were backfilled with Drainfill II (gravel) to the surface to promote groundwater or seepage access to the drain blanket. Unusual or special foundation treatment was not required at the upstream shell foundation on the left abutment or the right abutment.

7.0 EMBANKMENT FEATURES

7.1 GENERAL

The embankment is a zoned, rolled, earthfill structure. The embankment zones include an upstream shell of Random II and Random IV material, an Impervious Core, an Inclined (Chimney) Drain, a Horizontal (Blanket) Drain and a downstream shell of Random I material. The upstream slope is protected with Riprap and a Bedding layer. The downstream slope is

covered with topsoil seeded with native grasses. The embankment was constructed in three stages corresponding to the three construction seasons between 1990 and 1992. A synopsis of the embankment features is included as Table 6, Embankment Data. "As-Built" embankment cross sections detailing the embankment zones are presented in Plates 5 through 8.

7.2 CONSTRUCTION MATERIALS, SOURCES AND PROPERTIES

7.2.1 Random I, Downstream Shell

Almost all of the Random I material was obtained from the reservoir borrow area. Minor quantities were obtained from required excavations, mostly from the dam foundation area and the spillway. The Random I source material included residual soil, weathered rock, fine and coarse grained Older Alluvium, Recent Alluvium and slopewash. In place, the material spans a wide variety of soil types, but is predominantly a clay (CL) of low to medium plasticity, with varying percentages of sand, gravel and cobbles. The physical properties of the Random I materials are documented in the Classification and Compaction Test Results, and the Construction Placement Data presented on Plates 19 through 21.

7.2.2 Random II, Upstream Shell

Most of the Random II material was obtained from the reservoir borrow area. Approval was given to obtain some material from a source adjacent to the reservoir borrow area. This source, located on the right side of the reservoir above gross pool elevation 5785 feet, was designated the "extended" borrow area. The Random II source material included Upper Gravel, Basal Gravel and Buried Channel Deposits of Older Alluvium, coarse grained Recent Alluvium, and coarse grained alluvial fan deposits. The Upper Gravel, Basal Gravel, and Recent Alluvium generally consisted of mixtures of fines, sand, gravel, cobbles and boulders, with a wide variation in the amount of oversize (plus 8-inch) stone. The Buried Channel and alluvial fan deposits generally consisted of sand, gravel and cobble mixtures with fines content higher than the typical older and recent coarse grained alluvium and little or no oversize stone. Often the Upper and Basal Gravel layers were mixed with the overlying clay layers as they were being excavated. Much of the Random II material was processed through a Kolman or KoCal vibrating grizzly. Some material was hauled directly to the embankment where the oversize was removed and some material was processed through the rock plant jaw crusher. About forty (40) percent of the 1990 construction season cofferdam was built with "crusher run". The in-place Random II material is predominantly a clayey gravel with sand and cobbles. The physical properties of the Random II materials are documented in the Classification and Compaction Test Results and the Construction Placement Data presented on Plates 23 through 25.

7.2.3 Random IV, Upstream Shell

Random IV material was obtained from the fine grained Older Alluvium in the reservoir borrow area. The in-place Random IV is a fine grained soil that classified as a sandy clay (CL), or clay with sand (CL). This material is very similar to the Random I material. The

physical properties of the Random IV material are documented in the Classification and Compaction Test Results and Construction Placement Data presented on Plates 27 and 28.

7.2.4 Impervious Core

Impervious Core material was obtained from the fine grained Older Alluvium layers in the reservoir borrow area. The in-place Impervious Core material is predominantly a low to medium plasticity clay (CL) with sand and some gravel. The physical properties of the Impervious Core materials are documented in the Classification and Compaction Test Results and the Construction Placement Data presented on Plates 29 through 31.

7.2.5 Inclined (Chimney) Drain

The Inclined (Chimney) Drain, located immediately downstream of the Impervious Core, consists of a Transition II sand zone and a Drainage Fill II gravel zone . The Transition II and Drainage Fill II materials were obtained from offsite commercial sources and placed directly into the embankment, or were produced at the onsite rock plant. Offsite commercial sources included alluvial sand and gravel deposits located near the intersection of I-215 and 6200 South in Salt Lake City, or at the Point of the Mountain, on I-15 at the southern end of the Salt Lake Valley. The onsite rock plant was fed with a combination of offsite "raw" materials from the same sources and onsite alluvial gravel, cobbles and boulders obtained during the Random II "oversize" stone removal. An early attempt to utilize the onsite Recent Alluvium failed. Most of the Transition II and Drainage Fill II placed in the embankment was processed through the onsite rock plant. The in-place Transition II sand consists of poorly graded sand (SP), poorly graded sand with silt (SP-SM), or poorly graded sand with clay (SP-SC). The Drainage Fill II material is a poorly graded gravel (GP). The physical properties of the Inclined Drain materials are documented in the Classification Test Results and Construction Placement Data presented on Plates 33 through 35.

7.2.6 Horizontal (Blanket) Drain

The Horizontal (Blanket) Drain was placed on the downstream shell foundation below Elevation 5780 feet. The "three part" blanket was constructed by placing a Drainage Fill I gravel layer between a bottom Transition I sand layer and a top Transition II sand layer. The Transition I and II and Drainage Fill I materials were obtained direct from offsite commercial sources, or were produced at the onsite rock plant. The material sources were generally the same as for the Inclined Drain. Most of the Transition II and Drainage Fill I came from the onsite rock plant, whereas most of the Transition I was obtained direct from offsite commercial sources. In-place, both the Transition I and II sand consist of poorly graded sand (SP) or poorly graded sand with silt (SP-SM) and the Drainage Fill I material is a poorly graded gravel (GP) similar to the Drainage Fill II gravel. The physical properties of the Horizontal Drain materials are documented in the Classification Test Results and Construction Placement Data presented on Plates 33 through 35.

7.2.7 Riprap and Bedding, Upstream Dam Face

Riprap and bedding were obtained from an exposure of Nugget Sandstone at the town of Peoa, Utah. The shot rock was partially processed at the quarry, hauled about 31 miles to the site and stockpiled near the dam for final processing and sorting. The in-place rock is predominantly a moderately hard to hard sandstone that will resist weathering and breakdown. The physical properties of the rock have been determined in a series of "riprap" tests and are presented on Plate 36.

7.2.8 Topsoil, Downstream Dam Face

Topsoil was obtained from the reservoir borrow area. The material is a nutrient rich clay with sand and a relatively high organic content. Its ability to support vigorous native plant growth has been observed over the past few years at the damsite.

8.0 CONSTRUCTION PROCEDURES AND EQUIPMENT

Throughout construction there were numerous and varied changes made with respect to procedures and equipment. Changes or variations occurred through design and default. The original Contract Embankment Specification Section is presented as Appendix I. A summary of the original specifications, requirements, changes incorporated as a result of District guidance and accepted deviations are documented in Table 7. Construction procedures and equipment are documented in the following subsections and the equipment used to process, transport, place and process fill is summarized in Table 11. The photographs also show the equipment and construction procedures.

8.1 RANDOM I, DOWNSTREAM SHELL

Generally, Caterpillar 631E scrapers were push loaded using Caterpillar D9 or D10 dozers for direct haul to the embankment. The Caterpillar 245ME mass excavator or a trackhoe often loaded Caterpillar 769 rear dumps to supplement Random I placement in the downstream shell. Sometimes the trucks and scrapers dumped in different areas on the grade; most of the time the traffic was mixed. (It was more efficient to keep the truck and scraper traffic apart.) After dumping, Caterpillar D8 or D6 dozers were used to spread the lift to the resultant thickness of and to initially mix and blend materials of dissimilar moisture content or gradation. Lift thickness was controlled by the dozer operators. Placement and laydown generally proceeded in 15 to 25 foot wide lanes parallel to the dam axis from abutment to abutment. Except that adjacent to the Horizontal (Blanket) drain along the abutments, a lane was placed parallel to the blanket in an upstream to downstream direction. Sometimes after laydown, a motor grader adjusted lift thickness and smoothed out the lift. Mixing, blending and moisture conditioning were accomplished concurrent with oversize stone, debris and root removal. Dozers (Caterpillar D8 or D6) pulled the hinge type, offset 30 inch to 36 inch disk harrows through the lift as often as needed to moisture condition and mix and blend each lift. Often material was concurrently

borrowed from several different locations such that individual loads varied greatly in moisture content or gradation. As a result, considerable effort was expended on the grade processing the fill. Rock, root and debris removal was accomplished with a labor crew. Occasionally loaders equipped with scalping bucket attachments aided in oversize stone removal. Initially the Ingersoll Rand SPF60, a self propelled pad-foot roller, was the selected Random I compactor, but early in the first (1990) construction season the Caterpillar 825C compactor was evaluated and approved for rolling fine grained Random I. The SPF60 was still required for compacting coarse grained Random I. Since approximately 88 percent of the downstream shell is fine grained material, the Caterpillar 825C was used extensively with good results. At peak production, two Caterpillar 825C's were utilized. Compaction coverage often exceeded the minimum six (6) coverages required because of the operators tendency to "keep busy". Prior to lift placement, the top of the preceding lift was scarified with the disk harrows and moistened to improve lift bonding. Heavily trafficked areas were often ripped full depth with the motor grader, reprocessed and recompacted.

8.2 RANDOM II, UPSTREAM SHELL

The Contractor employed a variety of means and methods to obtain Random II materials. Initially dozers (Caterpillar D8 and D9) push loaded Caterpillar 631E scrapers for direct haul to the embankment. Recent (coarse grained) Alluvium, that had been previously stockpiled at the rock plant for the production of Transition and Drainage Fill, was eventually processed through the jaw crusher, dropped into a surge pile, picked up with the scrapers and placed in the embankment. This crusher run material comprised about 40 percent of the "cofferdam" portion of the dam constructed the first (1990) embankment placement season. By about midseason (July 1990), the first Kolman belt loader with vibrating grizzly was put into service. The bank material was still excavated with scrapers, and hauled to and from the Kolman with scrapers. During the second (1991) season the Random II hauling and placement evolved from a scraper to a truck operation. Euclid R25 rear dumps were used until the Caterpillar 769 rear dumps began to dominate the Random II haul operation. Scrapers were still used to stockpile materials for Kolman processing. The last (1992) season the Random II borrow and embankment operations were almost exclusively a truck operation with primarily Caterpillar 769C and 773B rear dumps. Two Caterpillar 245 mass excavators and several trackhoes were used with good success to excavate vertical benches in the borrow area. Occasionally the large Caterpillar 992 or 988 rubber-tired loaders were used to excavate and load borrow materials. Alone, the loaders were less efficient at excavating the undisturbed bank material, but their productivity increased when assisted with Caterpillars D10, D9 and D8 dozers. Some material was hauled directly to the embankment. Most of the time material was temporarily stockpiled at the Kolman or KoCal for processing. The Kolman and KoCal belt loader surge bins were charged using a trackhoe. This resulted in less clogging than when a dozer was used. Oversize (plus 8 inch rock) was best removed with a graduated grizzly bar spacing of about 4.5 inch to 6.5 inches. When the grizzlies wore out or when bank run material was hauled directly to the embankment, removal of the oversize on the embankment was costly and generally inefficient.

After dumping on the embankment, dozers (Caterpillar D8, D9 and D6) were used to

spread the lifts to the resultant thickness and to initially mix and blend materials of dissimilar moisture content or gradation. Lift thickness was controlled by the dozer operators. Wherever possible, placement and laydown proceeded in 25 to 75 foot wide lanes parallel to the dam axis. Abutment to abutment placement was often hindered by the location of haul roads across or on to the embankment from the right abutment. On grade processing was often complicated by purposely, 1) placing obviously wet fill with drier fill, 2) placing direct haul bank run material with significant oversize stone, 3) placing sand, gravel or cobbles over wet material to "dry back" the lift or 4) by adding sand, gravel or cobbles to adjust the gradation to the specified Random II gravel requirement. The Contractor's decision to process and moisture condition Random II on the embankment and not in the borrow area resulted in excessive and inefficient ongrade disking. Often to assist the disking and oversize stone removal, the lift was ripped with the motor grader. Lifts that were compacted by the hauling equipment were also ripped for processing. Mixing, blending and moisture conditioning was accomplished concurrent with oversize stone, debris, and root removal. Dozers (Caterpillar D8 or D6) pulled hinge type, offset 32 to 36 inch-diameter disk harrows through the lift as often as needed to moisture condition, and mix and blend each loose lift. Late in the last season (1992), the harrows were fitted with 42-inch-diameter disks. The larger disk and added weight improved the harrow's performance. It cut deeper and mixed better. Rock, root and debris removal was accomplished with a labor crew and in the last season two rubber-tired loaders and a small backhoe equipped with scalping buckets/rock rakes were also used.

Initially Ingersoll Rand SD150F, SD150D, and SPF60 vibratory rollers were used in sequence to compact the Random II. Later, as the demand for the SD150's grew elsewhere and the number of SPF60's increased to three, the SPF60 became the workhorse in the Random II zone. Compaction coverage normally exceeded the minimum five (5) coverages, again because of the operators tendency to "keep busy". In addition the compactors were misused. The Contractor often ran the compactors on unprocessed lifts supposedly to help mix and blend dissimilar soils, dry back lifts, and punch down or hide oversize stone. As a result, this "extra" nondirected rolling caused considerable confusion and promoted inefficiency. Prior to lift placement the top of the preceding lift was scarified with the disk harrows and moistened to improve lift bonding. To finish a lift the abutment contacts were wheel rolled with heavy rubber-tired equipment.

8.3 RANDOM IV, UPSTREAM SHELL

Equipment, placement and processing were generally the same as for Random I. Refer to paragraph 8.1, Random I, Downstream Shell.

8.4 IMPERVIOUS CORE

Impervious core material was almost always hauled directly to the embankment in Caterpillar 631E scrapers. The scrapers were push loaded with dozers (Caterpillar D10 or D9). The material was directly placed in a lift or for the abutment placement, it was stockpiled near the abutment. Occasionally Caterpillar 769 rear dumps were used to haul to abutment stockpiles.

The abutment placement equipment and procedures were different than the general core placement. Abutment placement extended from 10 to 30 feet out or away from the abutment contacts.

At the abutments the previous lift was prepared to receive the next lift by, 1) cutting back the thin sheared leading edges of the fill, 2) removing the thin dried edges, 3) scratching or scarifying the near abutment fill with the teeth on the bucket of a Caterpillar 416 or 426 backhoe, 4) scarifying as close to the abutment as possible with the large Rome disk harrow, and, finally, 5) moisture conditioning the fill and the rock. Initially the lifts were advanced to the abutment using a small dozer. In the second (1991) and third (1992) construction seasons, the rubber-tired front end loader dedicated to wheel-roll the abutment fill was used to excavate material from the adjacent stockpile and place it against the abutment. After the lift was pushed to the abutment and before rolling, large clods and rocks were removed by hand from the lift to abutment contact area. Wheel-rolling was accomplished with rubber-tired loaders. Caterpillar 950B and 980C loaders were used the first (1990) season. During subsequent seasons (1991 and 1992) a Mesco TCM 870 loader was often used and a Caterpillar 950 or 966 loader was sometimes used to wheel-roll the abutment. Wheel-rolling was performed approximately parallel and perpindicular to the abutment for at least six (6) coverages. Areas inaccessible to wheel-rolling were hand compacted with a variety of hand-equipment and methods.

Away from the abutments scrapers dumped the material and dozers (Caterpillar D8 or D6) spread the lift. Lift thickness was controlled by the dozer operators. The Impervious Core material consistently classified as clay (CL). Disking was performed to break up the clods, mix and blend and moisture condition the lift. Occasionally some oversize stone or topsoil had to be removed. Dozers (Caterpillar D8 or D6) pulled the hinge type, offset 32 to 36 inch disk harrows through the lift as often as needed for moisture conditioning. Mixing and blending was generally accomplished after two (2) to four (4) passes. The change to the Caterpillar 825C compactor occurred at the same time the roller was accepted for the Random I zone. The Caterpillar 825C performed well except that under the following circumstances this heavy compactor tended to produce laminations at the lift boundary when: 1) the top lift being compacted was thinner than 8 inches, 2) the top lift varied significantly from the previous lift in moisture content (either dry on wet or wet on dry), and 3) the lift was overcompacted. The Contractor was requested not to exceed the specified coverage. However, compaction coverage often exceeded the minimum six (6) coverages because of the limited width and working space in this relatively narrow embankment zone. Prior to lift placement the exposed top of the preceding lift was scarified with the disk harrows and moisture conditioned to improve bonding. Heavily trafficked or rutted areas were ripped and disked full depth and recompacted.

8.5 INCLINED (CHIMNEY) DRAIN

The Transition II sand and Drainage Fill II gravel were generally stockpiled off the embankment. The materials were transported to the embankment in a variety of trucks (Euclid R25, Caterpillar 769, Mack Tandems) and end dumped into coalescing piles along the length of the chimney. A Caterpillar D4 dozer was then used to spread the sand or gravel into a lift. Lift

thickness was controlled by the amount of material initially dumped in the zone and by the dozer operator. Most of the time the zones were compacted immediately after the lift was spread. Occasionally when the sand was rolled it became saturated inhibiting densification. In this instance the lift was ripped open and allowed to drain and dry out before rerolling. The Contractor used an Ingersoll Rand SD150D smooth drum roller to compact the Transition and Drainage Fill. The Transition II sand was compacted in the vibratory mode and the Drainage Fill II was compacted in the static mode. The compaction coverage was generally as specified in the contract. The placement of the Inclined (Chimney) Drain affected the overall progress of the embankment. Often the chimney elevation was several feet lower than the adjacent Random I zone, hampering Random I placement and production rates. Thus rolling of the chimney was minimized to facilitate production and increase placement rates.

8.6 HORIZONTAL (BLANKET) DRAIN

The three components of the drain, Transition I and II sand and Drainage Fill I gravel, were generally stockpiled off the embankment and transported to the embankment in a variety of trucks (Euclid R25, Caterpillar 769, Mack Tandem). Some of the initial placements in the valley bottom were accomplished using belly-dumps that transported the materials directly from offsite commercial sources. Placement procedures were different along the steeper abutment slopes than the flatter, wide open valley and bench sections of the foundation. In the valley bottom and wherever flatter foundation conditions allowed, the materials were end-dumped into piles or belly-dumped into windrows and spread to the resultant lift thickness with a Caterpillar D6 or D4 dozer. Lift thickness was controlled by probing the lifts and shooting elevations. Usually water was applied to the Transition I and II sand before compacting. Compaction was accomplished with the same Ingersoll Rand SD150D smooth drum roller used on the chimney. Compaction coverage was often greater than specified. The roller made passes as needed to improve the trafficability of the layers. In addition, the construction traffic resulted in increased compactive effort as the lift was advanced and spread. Care was taken during placement to minimize contamination of the blanket materials and prevent the foundation from being "sealed off". Proof-rolling of the foundation was kept to a minimum and the foundation was scarified with the disk harrow or the motor grader before the first Transition I sand layer was placed.

Along the abutments the Drain Blanket was built in stages starting with the placement of Transition I sand against the foundation. The Drainage Fill I was placed next and the Transition II layer was placed last. Each material was placed horizontally along the abutment in advance of the next adjacent blanket zone. Lift thickness and zone width (or thickness) were controlled with numerous measurements and lath markers. In order to maintain the proper thickness perpendicular to the slope, the zone widths were varied depending on the slope angle. The materials were placed with rubber-tired loaders. Initially materials were stockpiled just off the embankment for access. Later, movable steel storage bins were situated on the embankment close to the abutments. These bins were filled by backing a Mack Tandem rear dump into the bin for dumping. The loader then removed material from the open-ended bin for easy access to the work area. After all three zones were placed and confined or backed up with Random I, water was applied and the Ingersoll Rand SD150D smooth drum roller was used to compact the

lift. Rolling started with the required coverages on the "inside" Transition I sand against the abutment and finished with the required coverages on the Transition II sand along the "outside" edge. The roller was not allowed to overlap on to the Random I zone. Subsequently, because of the relatively narrow width of the three zones numerous "extra" coverages were applied. All passes were made in the vibratory mode and no additional coverage was attempted on the middle Drainage Fill I zone. Prior to placing the next lift the top of the previous lift was inspected and cleaned by hand of any and all contamination. The Random I to Transition II contact zone was later compacted in a separate operation.

8.7 RIPRAP AND BEDDING, UPSTREAM DAM FACE

Riprap and bedding placement did not start until after the working level/elevation of the Random II zone had progressed to a considerable distance or height above the riprap starting elevation. Riprap placement never caught up or kept pace with fill placement. Consequently, the Contractor had to expend considerable additional effort transporting and placing materials. In the beginning, materials were brought to the face of dam in trucks and scrapers and deposited close to the work area. As the work area expanded and the face of dam slope steepened, track loaders (Caterpillar 963 and 973) were needed to transport materials from temporary stockpiles up or down the slope to the placement area. Generally both bedding and riprap were placed with a trackhoe (Caterpillar 235 and 225). Handwork, barring and chinking, etc. completed the placement process.

8.8 TOPSOIL, DOWNSTREAM DAM FACE

The first topsoil placed on the downstream face was placed and spread using Caterpillar 631E scrapers. Later the Caterpillar 769 and 773 rear dumps were used to transport topsoil to the embankment. The trucks were backed to the edge of the slope and dumped. A dozer (Caterpillar D8 or D6) spread the topsoil. Placement was completed by trackwalking the slope (up and down) with a D8 dozer. The slope was seeded with native grasses.

9.0 EMBANKMENT QUANTITIES, DESIGN VERSUS AS-BUILT

With the exception of the Inclined (Chimney) Drain, the individual embankment zone quantities are within plus or minus 10 percent of the original design estimates. The Inclined Drain Transition II and Drainage Fill II required volumes were drastically reduced by Change Order Modification. In comparison actual foundation excavation underran the design/bid quantity by about 12 percent. Variations in quantities can best be attributed to changes in zone limits and inaccurate or incomplete survey data.

A comparison of As-Built versus Design/Bid quantities are presented in Table 1, Embankment and Excavation Quantities. Table 1 is based on estimated Final Quantities as of the last significant Monthly Payment. Final quantities will be slightly different.

10.0 QUALITY ASSURANCE, ACCEPTANCE AND RECORD TESTING

10.1 RESIDENT OFFICE

A Quality Assurance and Acceptance Testing program was implemented by the Resident Office through the efforts of a Field Unit and a Soils Laboratory. The Field Unit, comprised of a Chief Engineer and Inspectors, had as their goal the continuous monitoring of all embankment placement activities. Evaluation of foundation conditions was provided by the Project Geologist and a Geotechnical or Geologic Engineer. The Soils Laboratory accomplished a comprehensive testing program of all zones and provided continuous testing support to the Field Unit during embankment placement. Field and Laboratory testing was performed at the discretion of the Field Unit Chief. Acceptance Test frequency for the major embankment zones was sufficient to thoroughly document the quality of the embankment. The approximate test frequency was as follows: 1) Random I - 1 test series per 6,500 CY, 2) Random II - 1 test series per 4,600 CY, 3) Random IV - 1 test series per 5,000 to 6,000 CY, and 4) Impervious Core - 1 test series per 2,900 CY with about 22 percent of the IC tests performed near or at the abutments.

10.1.1 Laboratory and Field Tests

A complete Quality Acceptance test series generally included a field density, moisture content, gradation, moisture-density relationship, or relative density determination, and often Atterberg limits and specific gravity. Occasionally Los Angeles (LA) Abrasion tests were performed on the Transition and Drainage Fill materials. A description of the individual tests follows.

a) Field Density - Field density tests on all zones except Drainage Fill I and II were performed in accordance with ASTM D 1556, (Standard Test Method for Density of Soil In Place by the Sand Cone Method). Maximum particle sizes in the Impervious Core and Transition zones allowed the use of a 6-inch-diameter cone. During the first and part of the second construction seasons, a 6 or 12 inch-diameter sand cone was utilized in the Random I zone, as dictated by the material encountered. However, during the second construction season, it was decided to exclusively use a 12-inch-diameter sand cone in the Random I Zone to minimize questionable results (when material types varied) and minimize retesting when large particles were encountered in the sand cone holes. A 12-inch-diameter sand cone was always used to test the Random II zone due to the maximum particle sizes encountered. When testing the Random II zone, the top lift was tested after the top two to three inches were removed to allow the testing surface to be prepared as smooth and even as possible. When testing the Impervious Core, Random I and IV and Transition zones, the top lift was removed and the lower lift surface was made as smooth and even as possible for the test. Typically a 7 to 9 inch deep x 10 inch diameter hole was dug (volume varied between 0.29 and 0.39 cubic feet) whenever a 12-inch-diameter cone was used. When using the 6-inch-diameter sand cone, typically a 6 to 7 inch deep x 6-inch-diameter hole was dug (volume varied between 0.07 and 0.085 cubic feet).

b) Moisture Content - Moisture content tests were performed on materials from all zones

in accordance with ASTM D 2216 Standard Method for Laboratory Determination of Water (Moisture) Content of Soil, Rock, and Soil-Aggregate Mixtures. When it was necessary to determine field moisture content rapidly (not record tests), the Lab used the following methods:

1. Computer controlled microwave oven system for rapid water content determination. Reference U.S.C.E. Technical Report GL-88-21. This method was used 85 percent of the time.
2. ASTM D 4944, Standard Test Method for Field Determination of Water (Moisture) Content of Soil by the Calcium Carbide Gas Pressure Tester Method. This method was used 10 percent of the time.
3. ASTM D 4959, Standard Test Method for Determination of Water (Moisture) Content of Soil by Direct Heating Method. This method was used 5 percent of the time.

The above noted rapid test procedures were regularly checked by comparing moisture contents of companion samples dried in the conventional laboratory oven method (ASTM D 2216).

c) Gradation - Gradation Tests (Grain Size Analysis) were performed on samples from all zones within the embankment and the borrow area. As a general rule, samples taken for sieve analysis were not collected from sand cone hole material but from bulk samples taken from around the perimeter of the sand-cone hole. This allowed for much larger samples and, therefore, more accurate test results.

d) Moisture Density Relationships - Moisture Density Relationships were established using the following methods:

1. When maximum particle size and gravel content allowed, ASTM D 698, Standard Test Methods for Moisture Density Relations of Soils and Soils Aggregate Mixtures Using 5.5-lb. (2.49 Kg) Rammer and 12 inch (305mm) Drop was used.
2. When maximum particle size and gravel content dictated, Test Standard Appendix VI A, Compaction Test for Earth-Rock Mixtures found in U.S.A.C.E. EM 1110-2-1906 (12-inch Proctor) was used.

e) Relative Density Determinations - Relative density tests were performed on Transition I and II materials in accordance with ASTM D 4253, Standard Test Methods for Maximum Index Density of Soils Using a Vibratory Table. This test was performed to provide a record of the degree of compaction obtainable with the specified procedure. Field sand cone density tests were taken to establish whether the Transition materials were adequately compacted when compared to the minimum and maximum values established in the laboratory.

f) Atterberg Limits - The Atterberg limits of embankment soils were determined in accordance with ASTM D 4318, Standard Test Method for Liquid Limit, Plastic Limit, and Plasticity Index of Soils, Method A (wet preparation procedure).

g) Specific Gravity - The specific gravity of a soil mass was determined in accordance with Appendix IV of U.S.A.C.E. Manual EM 1110-2-1906, Specific Gravity. The specific gravity and absorption of coarse aggregates was determined in accordance with ASTM C-127, Standard Test Method for Specific Gravity and Absorption of Coarse Aggregate.

h) LA Abrasion - Embankment materials were tested for resistance to degradation in accordance with ASTM C 131, Standard Test Method for Resistance to Degradation of Small-Size Coarse Aggregate by Abrasion and Impact in the Los Angeles Machine, and ASTM C 535, Standard Test Method for Resistance to Degradation of Large-Size Coarse Aggregate by Abrasion and Impact in the Los Angeles Machine.

10.1.2 Field Inspection

During placement operations the Field Unit pursued Quality Assurance through the monitoring of field moisture control, lift control, gradation compliance, compaction control and on-grade-field processing. A brief description of the means and methods employed by the field to accomplish these tasks follows:

a) Field Moisture - Field moisture was initially monitored by use of lab test methods described below:

1. Computer controlled microwave oven
2. "Speedy" Moisture Device (calcium carbide gas pressure tester method)
3. Hot plate method (direct heating method).

The above rapid test procedures were regularly checked by comparing to companion samples dried by conventional oven method (ASTM D 2216).

Through time and experience, the Field Inspectors developed their own judgment by feel, visual methods and observation of equipment behavior. Field judgment was reinforced by requiring each inspector to estimate moisture content every time a sample was taken, then compare this estimate to actual Lab results. This ongoing review process provided the individual inspector with a certain degree of confidence for each type of material encountered. Contact and exchange of information with the responsible Contractor Quality Control (CQC) representatives fostered the development of their (CQC) judgment and enabled field personnel to respond, in many instances, to deficient areas without the need for conventional testing. The adequacy of the contractor's equipment was also monitored. Each Field Unit member was briefed regarding what equipment was approved for use on each zone. Properly sized disks which could be adjusted for depth of cut, were crucial to thoroughly mix materials to a homogeneous soil mass. Through diligent inspection it was learned that different materials required special efforts for proper moisture conditioning.

b) Lift Thickness - Lift thickness was monitored by visually comparing grade stakes placed alongside and adjacent to the working lift. In addition to this, the Field Unit would

visually check compacted lift thickness every time a sand cone test was performed and whenever test pits were cut into an embankment zone. Finally, the Field Unit attempted to assure that each placement operation included a Contractor Quality Control (CQC) Representative and laydown man to maintain the necessary controls and perform corrective action.

c) Gradation Compliance - Gradation compliance was initially monitored solely by use of conventional laboratory test methods and specially developed rapid test methods to determine gravel and fines contents. Through time, the Field Unit members were able to develop the experience to judge gravel and fines contents by inspection and visual methods. Field judgment was reinforced and enhanced by having each inspector estimate gravel and fines content each time a sample was taken. These estimates were then compared to actual test results. Each Field Unit member had periodic contact with Contractor (CQC) representatives to attempt to assure they also were developing judgment and responding to material variations encountered in each zone.

d) Compactive Effort - Each Field Unit Representative was aware of contract requirements restricting certain pieces of equipment to each specific zone. In addition operating speed, control modes (high or low vibratory frequency or nonvibratory modes), number of passes and overlap patterns were monitored. Regular equipment inspections were made to confirm operating frequency (VPM) was within the required range and disks and compactor pads were not overly worn. As with moisture content and gravel content, each inspector was required to estimate percent compaction when field density tests were witnessed. Therefore, in time each inspector was able to develop field judgment by observing how the fill reacted to equipment and how it reacted when probed with a geologist hammer. Field judgments/estimates were compared to actual field and laboratory test results. Judgment was also developed by onsite CQC representatives, who were then expected to respond to deficient or questionable areas.

e) Processing - Operating constraints (speed, patterns, operating modes, etc.) for each zone and equipment used were monitored by the responsible inspectors. Whenever a test pad was cut into the fill, the inspector would evaluate the lift and note whether the material was properly conditioned, blended and adequately compacted. Areas that revealed deficient fill were usually corrected. Areas that revealed questionable fill were often evaluated by Field Unit Supervisors and the Embankment Engineer in order to recommend subsequent corrective action. Field Unit members also attempted to assure that the Contractor maintained a QC presence in each fill zone being worked.

10.2 DIVISION LABORATORY

During the course of this project the South Pacific Division Laboratory (CESPD-ED-GL) provided support. The Division Laboratory performed laboratory inspections on the Resident Office's and Contractor's Soils Laboratories, tested record samples excavated from the embankment, and performed evaluations of proposed riprap sources.

10.2.1 Laboratory Inspections

The Government Lab was inspected three times during the construction of this project (once during each of the three construction seasons). These inspections were performed by representatives from the Corps of Engineers, South Pacific Division Laboratory. The scope of each inspection involved evaluation of all equipment and methods used by the Lab. Tests were routinely in progress during these inspections. Each inspection revealed only minor deficiencies which were immediately corrected. All requirements were met.

10.2.2 Record Sample Testing

Most of the laboratory testing of record samples collected from the embankment fill were performed by the South Pacific Division (SPD) Laboratory in Sausalito, California. The SPD Laboratory did contract some minor portions of the testing program to private laboratories due to shortages in laboratory manpower that occurred at various times during construction. The laboratory test reports are available in the Soil Design Section, Geotechnical Branch, Sacramento District. Refer to the Record Sampling and Testing Summary, Table 12.

10.2.3 Stone Protection Testing

Stone from four proposed sources was shipped to the Division Lab for evaluation. A preapproved source, the Peoa quarry, and the on-site cobbles and boulders were selected for use as stone protection and erosion control at the project. A summary of the laboratory test results is included on Plate 36.

10.3 SACRAMENTO DISTRICT, GEOTECHNICAL BRANCH

Record sampling of the as-constructed embankment was performed on five separate occasions. Samples were collected from the embankment by Sacramento District engineers and technicians and Little Dell laboratory personnel. Testing was performed at or through the South Pacific Division Laboratory (SPD). Refer to the Record Sampling and Testing Summary, Table 12.

10.3.1 Record Sampling and Testing

Prior to sampling, a contractor provided backhoe typically excavated a 3 to 5-foot deep trench around a 6 to 10-foot square soil block. Samples were carefully carved from the soil block and encapsulated in PVC cylinders and wax sealed at each end prior to shipment to the SPD Laboratory. Samples collected from the Random I and II zones were 15 inches in diameter and 30 inches in length. Impervious Core samples collected were 6 inches in diameter and 12 inches long. Prior to performing the shear strength tests, the Random I and II samples were trimmed in the laboratory to approximately 12 inches in diameter by 28 inches in length. The impervious core samples were trimmed to a diameter of approximately 2.25 inches by 5 inches in length. The final series of shear strength tests were performed on bulk samples collected from

the fill and recompacted in the laboratory to approximately the same moisture content and density as that placed in the embankment.

10.3.2 Record Sample Test Results

10.3.2.1 Random I, Downstream Shell

Laboratory record sampling test results of the Random I material are shown on Plate 22. Two series of R-bar shear strength tests were performed. Each series consisted of three specimens for a total of six tests. One of the series tested was from bulk samples collected from the fill and remolded to 98 percent of the standard compaction maximum dry density at one (1) percent wet of optimum moisture. The samples varied between clayey gravel with sand (GC) to sandy silt (ML). Results of the shear strength tests indicate the record sample or "as-built" "R" and "S" shear strength values are slightly less than that used in design. The "as-built" record sample "Q" strength envelope is approximately the same as the design envelope.

10.3.2.2 Random II, Upstream Shell

Laboratory record sampling test results of the Random II material are shown on Plate 26. A total of twelve triaxial R-bar shear strength tests were performed on the Random II fill material. As with the Random I, three of the Random II tests were performed on samples remolded to 98 percent of standard compaction maximum dry density at optimum moisture content plus one (1) percent. Obtaining 15-inch-diameter undisturbed record samples in the Random II was difficult. The Random II fill contains significant amounts of rock. In most of the samples some rock protruded from the sample and had to be removed. The resulting void was filled with sample carvings in the laboratory prior to testing. The Random II tested was considerably coarser than the downstream Random I fill material. The Random II samples consisted of clayey gravel with sand (GC) and clayey sand with gravel (SC). As with the Random I the "as-built" "R" and "S" strengths were slightly less than the values used in design. The selected "as-built" shear strengths were influenced by the lower remolded test results. The bulk specimens were remolded to optimum moisture plus one (1) percent. This is approximately 1.5 percent wetter than the average moisture content placed in the Random II zone. The remolding water content was intentionally selected high to represent weaker portions of the embankment placed wet of optimum moisture content.

10.3.2.3 Impervious Core

Laboratory record sample test results of the Impervious Core material are shown on Plate 32. Six triaxial "R-bar" shear strength tests and nine "Q" tests were performed on the impervious core. Samples tested varied between lean clay (CL) and sandy lean clay (CL). All samples tested were undisturbed. Shear strengths as determined from the record samples were determined to be slightly higher than design values for each of the three strength parameters, "Q", "R", and "S". The compression index, Cc determined from one consolidation test was 0.09. This compares closely to values obtained for random fill material during design which ranged from 0.07 to 0.11.

11.0 EMBANKMENT PROPERTIES

11.1 RANDOM I

Random I placement was initiated in late October 1990. Very little (<2,000 CY) material was placed to cover the drain blanket in the downstream streambed area. The first real production season occurred in 1991. Placement began in mid-June and continued into late October. Approximately 870,000 CY were placed this season, comprising 41 percent of the total Random I volume. Placement resumed about 1 April 1992. Approximately 1,236,000 CY were placed this last season, representing the remaining 59 percent of the Random I. The following discussions are based on test results obtained at 325 locations, which represents a frequency of 1 per 6500 CY. The test locations were well distributed throughout the Random I zone.

As-Built and design information are included in Tables 6 through 9. A summary of record test results is presented on Plate 22. Material properties and As-Built information, including variations in embankment quality with elevation and by season, are presented on Plates 19 through 21.

11.1.1 As-Built versus Design

A direct comparison of As-Built versus design soil properties cannot be made for the Random I zone. Initially the design envisioned a clayey gravel upstream and downstream shell. Late in the design phase it was recognized the downstream shell could be constructed with fine grained soils. This change was incorporated into the plans and specifications, but not the Embankment and Spillway Design Memorandum. As constructed, the Random I shell meets and/or exceeds the design objectives, as required by the specifications and the guidance provided by Sacramento District Geotechnical Branch. The materials are predominantly (89 percent) fine grained soils with a wide variation in grain size distribution. Soil types include low to medium plasticity lean clays (CL) and minor volumes of high plasticity fat clay (CH), sand (SC) and gravel (GC). Only a very low percent or volume of material was considered unsatisfactory because of its high plasticity or oversize rock content and this unsatisfactory material is randomly distributed throughout the shell. Even though the Contractor had some trouble controlling moisture, overall compaction was excellent. The Random I materials were compacted at an average moisture content of 14.8 percent, attained an average 102.3 percent compaction (standard effort) at a corresponding average moisture content of minus 1.2 percent with respect to the optimum moisture content. Approximately 80 percent of the shell was compacted dry of optimum.

11.1.2 Variation by Construction Season

There is essentially no difference in the soil types used to build the downstream shell between the 1991 and 1992 construction seasons. For 1992 there was a very slight increase in percent compaction and a corresponding increase in the inplace dry unit weight. Placement moisture content and moisture content with respect to optimum also appear to be slightly higher

in the 1992 season. Apparently, the changes instituted for the 1992 season (i.e. increase in loose lift thickness and a broader allowable moisture band) did not significantly affect the quality of the embankment.

11.1.3 Variation in Quality with Elevation

The data indicates the Random I zone was consistently constructed on the dry side of optimum moisture to a relatively high percent compaction. There does not appear to be any significant change in properties with elevation. There are some minor trends that are apparent; 1) late season placements tended to be drier, probably due to the hot, drier weather, 2) above elevation 5635 feet compaction appears more consistent, and 3) it is noted that the highest compaction correlates with dry placement moistures near 2 percent dry of the laboratory optimum.

11.1.4 Anticipated Performance

The Random I zone is expected to perform well. As a whole, the As-Built condition of the downstream shell exceeds the design requirements with respect to compaction.

11.2 RANDOM II

Random II placement was initiated in late April 1990. The first placement was in the deep ravine on the right abutment. Following placements occurred in the left half of the streambed area against the abutment. The work continued with several adjacent partial fill sections until the end of October 1990. The accumulative 1990 placement became known as the cofferdam. Approximately 425,000 CY were placed this first construction season comprising only 21 percent of the total Random II volume. Although the 1991 embankment construction season began in mid-May 1991, Random II placement did not resume until the latter part of July 1991. The placement was coordinated or paced by the advancement of the downstream shell and impervious core. By the end of the construction season in late October 1991, the cofferdam was effectively buttressed on the downstream side. Approximately 432,000 CY were placed this second season, bringing the accumulative placement to approximately 42 percent of the total Random II volume. The 1992 construction season began very early. Restoration, moisture conditioning and recompaction of the "weathered" near surface Random II material began in mid-March, 1992. Random II placement resumed in late March 1992, and was terminated on or about 10 October 1992, when the dam was topped out. Approximately 1.2 million CY were placed this third construction season, comprising the remaining 58 percent of the Random II. The following discussions are based on test results obtained at 447 locations, which represent a frequency of 1 per 4,600 CY. The test frequency was somewhat greater near the maximum section and less frequent towards the right abutment. Haul road locations on the right abutment made it difficult to test in this area. Approximately 4.5 percent of the tests were located at or near the abutments.

As-Built and design information is included in Tables 6 through 9. A summary of record test results is presented on Plate 26. Material properties and As-Built information, including

variations in embankment quality with elevation and by season, are presented on Plates 23 through 25.

11.2.1 As-Built versus Design

Probably the largest difference between the As-Built condition and the design is the "cofferdam". Evaluation of the dam should take into consideration this difference, as well as the changes in the Random II zone from construction season to season. The "cofferdam" properties are defined by the first (1990) season data.

The original design required that the upstream shell be constructed of a clayey gravel (GC), well compacted to achieve high strength. Late in the last (1992) construction season a modification was prepared by the District to allow the use of fine grained soil in a limited portion of the upstream shell. This new zone was designated the Random IV Zone. It was constructed to the Random I downstream shell zone requirements. Furthermore, throughout construction, the Sacramento District provided considerable guidance or refinements to the design. Refer to Table 7 for a summary of the Specifications, District Guidance and Accepted Deviations. As constructed, the Random II portion of the upstream shell generally meets and/or exceeds the design objectives as required by the specifications and District guidance. The materials are with rare exception coarse grained soils with a wide variation in grain size distribution. The materials include gravels and sands with varying percentages of fines, sand and cobbles that classified as GC, GM, GP-GC, GW-GC, GW-GM, GC-GM, SC and SC-SM. The majority of the Random II consists of a clayey gravel with sand and cobble (GC). In place dry unit weight and degree of compaction are generally greater than the design values. Thus, the Random II zone can be characterized as denser and more compact than envisioned in design. The Random II materials were compacted at an average moisture content of 8.7 percent, attained an average 100.0 percent compaction (standard effort) at a corresponding average moisture of minus 0.5 percent with respect to the optimum moisture content. Approximately 63 percent of the Random II shell was compacted dry of optimum. Record sample testing indicates the design strength is exceeded for the materials compacted to at least 98 percent compaction between minus 3.0 percent and plus 1.0 percent of optimum moisture content.

11.2.2 Variation by Construction Season

There are significant differences in the Random II materials from season to season. The 1990 season materials, i.e. the cofferdam, were more granular or coarser than most of the Random II. The sand and gravel content was the highest and the fines content the lowest the 1990 season. In subsequent construction seasons the materials became finer with time, with the exception that the percentages of oversize (plus 8-inch) incorporated into the embankment the 1992 season was substantially greater than the previous two years. The plasticity of the fines also appeared to increase as construction progressed. Although the average yearly percent compaction did not change significantly, the inplace dry unit weight of the 1990 placement (cofferdam) is considerably higher than the subsequent 1991 and 1992 season placements.

Comparisons of direct and relative moisture contents also indicate the inplace materials were significantly drier in the 1990 season, wetter the following two seasons, with the 1992 season placement being the wettest. In conclusion, the "cofferdam" zone within the upstream shell is more granular and denser, and thus stronger and more permeable than other portions of the shell.

11.2.3 Variation in Quality with Elevation

The data indicates the Random II was ususally constructed on the dry side of optimum to a relatively high percent compaction. There appears to be no radical change in properties with elevation. However, there are some differences that need discussion. First, the "extended borrow area" zone, located between approximately elevation 5700 and 5712 feet, was constructed with materials obtained from the "extended borrow area". These materials classified as clayey gravel with sand and cobbles, but were generally finer with more plastic fines than the typical Random II materials. In this zone there was a very slight decrease in percent compaction, but the inplace dry unit weight is low by comparison, i.e. an average 117.8 pounds per cubic foot versus 125.8 pounds per cubic foot for all the Random II. Secondly, in late July and early August, 1992, between approximately elevation 5730 and 5740 feet materials were compacted wetter than usual. This resulted in lower overall percent compaction. Compaction declined to a running average of about 97 percent compaction versus 100 percent for all the Random II. These two zones, elevation 5700 to 5712 feet and elevation 5730 to 5740 feet, are considered the weakest portions of the Random II shell. As previously discussed the "cofferdam" is considered the strongest portion of the Random II shell, even though the properties of the cofferdam are not evident when the data is sorted by elevation. Other trends apparent in the data include: 1) drier placement late in the season, probably due to the hotter, drier weather, 2) higher percent compaction correlating with drier placement moistures between 1 to 2 percent below optimum, 3) more erratic compaction during the early stages of construction, 4) superior compaction between about elevation 5645 and 5710 feet and 5) an overall lower level of compaction above elevation 5710 feet. The drop off in percent compaction the last construction season may be attributed to faster roller speeds, an adverse impact of the increase in percent oversize left in the embankment, or possibly less rolling associated with higher production.

11.2.4 Anticipated Performance

The Random II zone is expected to perform well. As a whole, the As-Built condition of the upstream shell exceeds the design requirements with respect to compaction. Even though there are some variations in quality in the Random II zone, it is anticipated this zone will perform well. One minor problem appears to be shallow sliding or downslope creep of the over-steepened crest shoulders. The movement is most likely a result of relatively poor compaction or construction during adverse weather near the end of the last (1992) construction season. Since the upstream face has been ripraped, it may be difficult to fully rectify the situation. Restoration of the crest road subgrade and paving was completed during the summer and fall of 1993.

11.3 RANDOM IV

In response to a design modification the Contractor placed a Random I type material in a very limited portion of the upstream shell. The zone, designated Random IV, was constructed in approximately a 10-day period in September 1992. It extends from about elevation 5765 to 5786.5 feet and perhaps to elevation 5798 feet. The limits of this zone were not well documented above elevation 5786.5 feet. Between elevation 5786.5 and 5798 feet the zone was constructed as ill defined Impervious Core and Random II zones. Our best estimate sets the total Random IV placement at between 55,000 and 65,000 CY. The following discussions are based on test results obtained at 11 locations which represents a frequency of 1 per 5,000 to 6,000 CY. Test locations were not well distributed throughout the zone because of haul road locations, and equipment congestion on the embankment during this period.

As-Built and design information is included in Tables 6 through 9. Record tests were not performed on the inplace Random IV because of the limited volume and its similarity to the Random I. Material properties and As-Built information, including variation in embankment quality with elevation, are presented on Plates 27 and 28.

11.3.1 As-Built versus Design

The Random IV zone design was provided by Sacramento District Geotechnical Branch in a September 1992 Memorandum. The Little Dell Resident Office had requested the evaluation of a rezoned upstream shell to expedite construction and assure completion in 1992. The analysis assumed the materials and construction procedures would be the same as for the Random I downstream shell. A stability analysis was performed using previously obtained Random I, Random II and Impervious Core record sample test results. As constructed, the Random IV zone exceeds the design objectives as outlined in the Rezoning of the Upstream Shell Memorandum prepared by the District. The materials are medium to high plasticity clays (CL) with sand and gravel. The Contractor controlled compaction moistures within the specified range and the resultant overall compaction was excellent. The Random IV materials were compacted at an average moisture content of 17.2 percent, attained an average 102.5 percent compaction (standard effort) at a corresponding average moisture of minus 0.7 percent with respect to the optimum moisture content. Approximately 65 percent of the zone was compacted dry of optimum.

11.3.2 Variation by Construction Season

Random IV was placed only in September 1992, in a limited zone between elevation 5765 and 5786.5 feet.

11.3.3 Variation in Quality with Elevation

The Random IV zone between elevations 5765 and 5786.5 feet is a well compacted, relatively homogeneous fill. Between elevation 5786.5 and 5798 feet the Random IV zone was actually constructed as Impervious Core and Random II. There is no Random IV

test data for the embankment above 5786.5 feet.

11.3.4 Anticipated Performance

The Random IV zone is expected to perform well. The As-Built condition of this zone exceeds the design requirements.

11.4 IMPERVIOUS CORE

Impervious Core placement was initiated in late September 1990, and continued through October 1990. Approximately 16,300 CY were placed this first construction season, comprising only 2.9 percent of the total Impervious Core volume. During the second season, placement of Impervious Core did not resume until early July 1991, when the downstream shell construction "caught up" to the elevation of the core. By the end of the second construction season in late October 1991, approximately 246,800 CY had been placed, bringing the accumulative placement to about 43.8 percent of the total Impervious Core volume. During the third season, restoration of the weathered and deteriorated core was accomplished and placement resumed in April 1992. Approximately 316,300 CY were placed this last season, representing the remaining 56.2 percent of the core. The following discussions are based on test results obtained at 191 locations, which represents a frequency of 1 per 2,900 CY. Test frequency is somewhat greater between Station 11+00 and 22+00. Approximately 19 percent of the tests were located at or near the abutments.

As-Built and design information is included in Tables 6 through 9. A summary of record test results is presented on Plate 32. Material properties and As-Built information, including variations in embankment quality with elevation and by season, are presented on Plates 29 through 31.

11.4.1 As-Built versus Design

The design required that the core be constructed of clay, well compacted to achieve acceptable strength, flexibility, and low permeability. Clay placed at or near the abutments was required to be wetter and to have at least 70 percent fines. As constructed, the Impervious Core generally meets and or exceeds the design objectives as required by the specifications and the guidance provided by Sacramento District Geotechnical Branch. Almost all of the material placed was a low to medium plasticity lean clay (CL) with variable sand and gravel content. Soil types primarily include clay, clay with sand and sandy clay with limited quantities of gravelly clay with sand and sandy clay with gravel. Nearly all the Impervious Core material met the specified minimum fines content and material that did not is randomly distributed throughout the core. The fines content of the Impervious Core material averaged 80 percent at the abutments and 77.6 percent elsewhere. Usually the Contractor was able to control moisture and construct a well compacted, relatively homogeneous, impermeable and flexible core. In place dry unit weight and degree of compaction are generally greater than the design values, and the upper half of the core is wetter than the lower half. Thus the Impervious Core can be characterized as denser than envisioned in design with the top half being more flexible and

compressible than the lower half. The Impervious Core materials were compacted at an average moisture content of 17.6 percent, attained an average 100.7 percent compaction (standard effort) at a corresponding average moisture of minus 0.3 percent with respect to the optimum moisture content. Approximately 57.6 percent of the core was compacted dry of optimum. On the other hand, the impervious core material placed at or near the abutments was compacted at an average moisture content of 18.7 percent, attained an average 99.1 percent compaction (standard effort, wheel-rolled) at a corresponding average moisture of plus 0.3 percent with respect to optimum. Approximately 66.7 percent of the abutment material was compacted wet of optimum.

11.4.2 Variation by Construction Season

There are some differences in the material and properties of the core, particularly between the 1990 construction season and the 1991 and 1992 seasons. The material used in the 1990 season was a medium plasticity clay with an average fines content of 83 percent versus 77 percent to 78 percent for subsequent seasons. In addition, the 1990 materials had higher optimum moisture contents and lower maximum dry densities. As a result, placement moistures were relatively high (average 19.5 percent), but usually dry of the optimum moisture and inplace dry unit weights are 4 to 6 pounds per cubic foot lower by comparison even though percent compaction is high (average 101.5 percent). A heavy rubber-tired loader was used to compact much of the first season's placement as the embankment "got off the bottom." Two different compactors, an Ingersol Rand SPF60 and a Caterpillar 825C, were used until it was decided to use the Caterpillar 825 exclusively on the core. The percent compaction achieved in the 1990 season was generally high, although somewhat erratic, partially due to the use of the different compaction equipment. In the 1991 season the percent compaction was consistently very high (average 102.0 percent). In the 1992 season the percent compaction was again consistently high (average about 99.5 percent), except for a period during late July and August when the materials were placed wetter than usual. During late July and August there were some periods the placement moistures averaged between plus 1 percent and plus 2 percent above the optimum moisture content, and the average percent compaction dropped to about 96 percent. Generally the core was compacted dry of optimum during the 1990 and 1991 seasons and near optimum during the 1992 season. The change instituted for the 1992 season (i.e. increased loose lift thickness to 10 inches) probably contributed to the overall lower percent compaction and inplace dry unit weights during this period.

11.4.3 Variation in Quality with Elevation

The data indicates there are some differences in the properties of the core with elevation that often correspond to the differences between construction seasons. Usually materials were placed dry of optimum moisture content from elevation 5575 to 5675 feet and near optimum above elevation 5675 feet, except for the July and August 1992 periods. The wetter July and August placements occurred between approximately elevation 5725 and 5760 feet Correspondingly, percent compaction is generally very high between elevation 5575 and 5675 feet and high above elevation 5675 feet, except where there is a drop in percent compaction concurrent with the wetter placements between approximately elevation 5725 and 5760 feet. It

appears the lower compaction observed above elevation 5675 feet is a result of the increase in placement moisture and loose lift thickness that occurred the last construction season.

11.4.4 Anticipated Performance

The Impervious Core zone is expected to perform well. The materials used are of superior quality for an impervious core. As a whole the As-Built condition exceeds the design requirements. Even though the embankment placed between elevation 5725 and 5760 feet may contribute to increased settlement, the differences in the upper half of the zone as compared to the lower half are considered to be beneficial. The upper half should be more flexible and plastic than the lower half.

11.5 TRANSITION FILL I

Transition I placement was initiated in late September 1990 and continued through late October 1990. Approximately 153,000 cy were placed this first construction season comprising only 10 percent of the total Transition I volume. After restoration and foundation preparation were achieved, Transition I placement resumed in mid-May 1991. By the end of July 1991, the valley section had been completed. Placement continued up the abutments until late October 1991. Most of the Transition I was placed this year (1991) and by the end of the construction season approximately 23,500 CY had been placed bringing the accumulative placement to 78.3 percent. Approximately 6,500 CY or 21.7 percent of the Transition I material was placed the last (1992) construction season between mid-April and mid-September 1992. The following discussions are based on gradation tests from 71 sample locations and inplace density tests (sand cones) at 56 locations. Gradation tests were performed at a frequency of about 1 per 425 CY and density tests were performed at a frequency of about 1 per 535 cy. The high sample and test frequency was considered necessary as a result of the numerous material sources used, the Contractor's processing capability and changes, and the importance of the Horizontal (Blanket) Drain.

Material properties and As-Built and design information are included in Tables 6 and 7, and on Plates 33 and 34.

11.5.1 As-Built versus Design

The design requires the Transition I component of the Horizontal (Blanket) Drain to be a clean, hard, durable sand meeting filter criteria. As constructed, the Transition I layer meets filter criteria and in general meets the design objectives as required by the specifications and the guidance provided by Sacramento District Geotechnical Branch. However, there is a section of the Transition I layer in the valley bottom, between Station 13+50 and 15+50 and between 200 and 750 feet downstream and other scattered isolated zones where the fines content exceeded the specified 5 percent maximum. The impact of isolated, scattered, out-of-spec materials, particularly along the abutments, is considered negligible. The section of "dirty"

Transition I in the valley bottom will likely not be detrimental. Nonetheless, field observation and limited testing indicates a significant decrease in permeability occurs with a small increase in the Transition I fines content. The materials placed classified as poorly graded sand (SP) or poorly graded sand with clay or silt (SP-SC or SP-SM). The various lifts and layers were compacted to an average of 69 percent relative density and an average 114.9 pounds per cubic foot dry unit weight. Eighty-five percent of the inplace density tests recorded a relative density greater than 50 percent.

11.5.2 Variation by Construction Season

There is only a slight difference in gradation from construction season to season. There are differences in average relative density, inplace dry density and placement moisture content. The differences in relative density and inplace dry unit weight may be a reflection of differences in particle angularity and specific gravity. The lowest relative densities were recorded in the 1991 season and the highest were recorded in the 1990 season. On the other hand, the lowest inplace dry unit weights were recorded in the 1992 season and the highest in the 1990 season. Average placement moisture generally increased slightly with each subsequent season.

11.5.3 Variation in Quality with Elevation

Except as indicated by the construction season variations, there appears to be no significant variation or differences in the Transition I with elevation. The 1990 and 1991 placements end and the 1992 placements begin at approximately elevation 5667 feet. The 1990 and 1991 end of construction grades are shown on the As-Built Embankment Sections.

11.5.4 Anticipated Performance

The Transition I layer is expected to function adequately, generally meeting the design requirements. Based on the data and the behavior of the Transition I sand to date, it does not appear there will be any problems. However, it can only be speculated at this time what effect the limited area of lower permeability Transition I will have on the embankment, foundation and seepage. Continued monitoring of the embankment's performance, particularly during initial filling, may help determine the influence of this area of less pervious Transition I.

11.6 TRANSITION FILL II

Transition II placement was initiated in mid- September 1990, and continued through late October 1990. Approximately 5,000 CY were placed this first construction season comprising only 4.6 percent of the total Transition II volume. Placement resumed in early June 1991 and continued into late October 1991, bringing the accumulative placement to about 48,000 CY or 44.6 percent of the total volume. Approximately 59,700 CY were placed the last (1992) construction season, representing about 55.4 percent of the total Transition II volume. The following discussions are based on gradation tests from 126 sample locations and inplace density tests (sand cones) at 116 locations. Gradation tests were performed at a frequency of about 1

per 850 CY and density tests were performed at a frequency of about 1 per 930 CY. The high sample and test frequency was considered necessary as a result of the numerous sources used, the Contractor's processing capability and changes, and the importance of the Horizontal and Inclined Drains.

Material properties and As-Built and design information are included in Tables 6 and 7, and on Plates 33 and 34.

11.6.1 As-Built versus Design

The design requires the Transition II component of the Inclined and Horizontal Drains to be a hard, durable sand meeting filter criteria. Since the Transition II sand does not need to be as permeable as the Transition I sand, a higher fines content was allowed. As constructed, the Transition II layer meets filter criteria and the design objectives as required by the Specifications and the guidance provided by the Sacramento District Geotechnical Branch. The materials placed classified as poorly graded sand (SP) or poorly graded sand with clay or silt (SP-SC or SP-SM). Most of the Transition II placed met Transition I requirements and is very similar in gradation. The Transition II fines content averaged 4.8 percent and usually ranged between 3 and 6 percent. The materials were compacted to an average 74 percent relative density and average 117.7 pounds per cubic foot dry unit weight. Ninety-three percent of the inplace density tests recorded a relative density greater than 50 percent.

11.6.2 Variation by Construction Season

Overall the 1991 and 1992 construction season materials, gradation and properties are very similar. The apparent differences in the 1990 season placement are not significant. The materials placed in 1990 appear to be slightly finer and cleaner than in subsequent years. Average placement moisture content was substantially lower (6.5 percent) in the 1990 season versus (8.7 percent) in the 1991 and 1992 season. The drier placement moisture content may account for the lower relative densities recorded in 1990, but the inplace dry unit weights attained in 1990 are similar to the 1992 season. The 1991 season placement achieved higher, by about 2 pounds per cubic foot, average inplace dry densities.

11.6.3 Variation in Quality with Elevation

Except for gradation, the variations in Transition II with elevation are reflected by the construction season variations. The 1990 and 1991 placements end and the 1992 placement begins at approximately elevation 5669 feet. The 1990 and 1991 end of construction grades are shown on the As-Built Embankment Sections. With respect to gradational differences, there were periods when most or all of the material placed classified as poorly graded sand with clay or silt (SP-SC or SP-SM), with the fines content in the 5 to 8 percent range. These SP-SC/SM zones may exhibit relatively lower permeability with respect to the other portions of the Transition II zone and are located between elevations 5600 to 5610 feet, 5625 to 5670 feet, and 5780 to 5798 feet.

11.6.4 Anticipated Performance

The Transition II layer meets the design requirements and is expected to function adequately. The effects of the SP-SC/SM zones/layers should not be detrimental on the overall performance of the Horizontal and Inclined Drains.

11.7 DRAINAGE FILL I

Approximately 7,500 CY of Drainage Fill I were placed in October 1990, comprising about 12.7 percent of the total volume. Most, about 45,700 CY, of the Drainage Fill I was placed the second construction season between mid-May and mid-October 1991. At the end of the 1991 season approximately 77.8 percent of total volume had been placed. During the last construction season the remaining 13,000 CY or 22.2 percent of the Drainage Fill I was placed from mid-April to mid-September 1992. The following discussions are based on gradation tests from 76 sample locations, representing a frequency of about 1 per 775 CY. The high test frequency was considered necessary in view of the various material sources used, the Contractor's processing capability and the importance of the Horizontal (Blanket) Drain.

Material properties and As-Built and design information are included in Tables 6 and 7, and on Plate 35.

11.7.1 As-Built versus Design

The design requires the Drainage Fill I component of the Horizontal (Blanket) Drain to be a clean, hard, angular, durable gravel, compatible with the Transition I and II sand layers and capable of freely and quickly transmitting the expected embankment and foundation seepage. As constructed, the Drainage Fill I layer meets filter criteria and the design objectives as required by the specifications. All materials placed classified as poorly graded gravel (GP).

11.7.2 Variation by Construction Season

There is very little difference in average gradation from construction season to season. Nonetheless, the gravel placed in 1990 was slightly cleaner and more uniform than subsequent seasons.

11.7.3 Variation in Quality with Elevation

During the production and placement of Drainage Fill I there would be occasional periods when the gravel would be dirtier than usual and have clay or silt coatings. Typically for the clean gravel the fines content ranged between 0.5 and 1.5 percent. When the gravel "ran dirty" the fines content generally increased to about 2 to 5 percent. The periods and locations of the dirtier gravel placements are as follows:

1) first half of June 1991 in the valley bottom,

2) late October 1991 along the abutments between elevation 5650 and 5665 feet, and
3) at the end of April and early May 1992 along the abutments between elevation 5665 and 5675 feet

11.7.4 Anticipated Performance

The Drainage Fill I layer is expected to function well, meeting the design requirements. The drain capacity greatly exceeds the expected seepage. The "dirty gravel" zones should not affect the performance of the Blanket Drain in that the permeability of the gravel is not substantially reduced by the fines. However, as the Drainage Fill I layer transmits seepage, the fines will migrate and settle out in isolated low areas. This may reduce the effective layer thickness and thus capacity in some areas. Fines may also eventually wash to the seepage collection system at the toe of the dam. Since the capacity of the system is much greater than the expected seepage, the Horizontal (Blanket) Drain should perform well, particularly with some periodic maintenance (jetting) of the collection system.

11.8 DRAINAGE FILL II

Drainage Fill II placement the first construction season was minimal, amounting to about 900 CY in the last three days of October 1990. Placement of Drainage Fill II did not resume until early July 1991, when the downstream shell construction "caught up" to the elevation of the core. By the end of the second construction season in late October 1991, approximately 22,500 CY had been placed, bringing the accumulative placement to about 31.1 percent of the total volume. Most, 49,900 CY or 68.9 percent, of the Drainage Fill II was placed the last construction season between mid-April 1992 and late September 1992. The following discussions are based on gradation tests from 57 sample locations representing a frequency of about 1 per 1,300 CY. The high test frequency was considered necessary in view of the various sources used, the Contractor's processing capability and the importance of the Inclined (Chimney) Drain.

Materials properties and As-Built and design information are included in Tables 6 and 7, and on Plate 35.

11.8.1 As-Built versus Design

The design requires the Drainage Fill II component of the Inclined (Chimney) Drain to be a relatively clean, hard, durable gravel, compatible with the Transition II sand layer and capable of transmitting the expected seepage. As constructed, the Drainage Fill II zone meets filter criteria and the design objectives as required by the specifications. All the material placed was very similar to the Drainage Fill I and classified as a poorly graded gravel (GP).

11.8.2 Variation by Construction Season

There is essentially no difference in gradation or quality from construction season to season.

11.8.3 Variation in Quality with Elevation

Similar to the Drainage Fill I, there would be occasional periods when the Drainage Fill II gravel "ran dirty", with clay and silt coatings on the particles. Otherwise there is essentially no difference in gradation or quality with elevation.

11.8.4 Anticipated Performance

The Drainage Fill II layer is expected to function well, meeting the design requirements. The "dirty gravel" zones should not affect the performance of the Inclined Drain, even if the fines migrate and become trapped in low areas of the drain.

11.9 RIPRAP I AND BEDDING

Riprap and bedding were placed on the upstream face of the dam between late June and December 1992. The rock was obtained from an outcrop of the Nugget Sandstone in Peoa, Utah. The source had been preapproved, but two additional record samples were selected for testing. Gradations tests were also performed on inplace samples obtained at well distributed locations across the face. Material properties and As-Built and design information are presented on Plate 36.

11.9.1 As-Built versus Design

As constructed, the Riprap and Bedding generally meets and/or exceeds the design objectives. A majority of the stone is a moderately hard, to very hard, well cemented, thinly to medium bedded, aeolian sandstone that is resistant to weathering. A small percentage of the stone is a less cemented or weathered porous sandstone that will be less resistant to weathering. The small percentage of unsatisfactory stone is randomly and widely distributed across the dam face.

11.9.2 Variation by Construction Season

Riprap I and bedding were placed only in 1992.

11.9.3 Variation in Quality with Elevation

Except for some of the initial work, the quality and gradation of the Riprap and Bedding consistently met requirements. Some of the initial Riprap placements at low elevation towards the left abutment were smaller gradationally than specified. These limited undersized portions of the Riprap represent a very small percent of the total volume of Riprap placed. Typically the Bedding gradation was borderline or within the specified band.

11.9.4 Anticipated Performance

The Riprap I and Bedding are expected to perform well. As a whole, the As-Built condition exceeds the design requirements.

11.10 TOPSOIL

Topsoil was placed on the downstream face of the dam during the latter part of the 1991 construction season and during 1992. Portions of the face were seeded in 1992. Final dressing, erosion repair and seeding occurred in 1993. The topsoil is expected to support a vigorous plant growth.

12.0 INSTRUMENTATION

The embankment and foundation performance was monitored during construction by a Geological Engineer assigned to be the Instrumentation Engineer. The Instrumentation Engineer had responsibility for both instrument installation and subsequent data acquisition. The Instrumentation Engineer reviewed, evaluated and summarized the data and presented the data and findings to the Embankment Engineer. A variety of instrumentation was installed including open tube piezometers, vibrating wire piezometers (VWPs), observation wells, inclinometers, survey monuments and seepage flow measuring devices. The instrumentation was installed in phases correlating to the staged embankment construction and is generally distributed along five (5) sections perpendicular to the dam axis, at Stations 13+00, 15+50, 18+00, 20+50 and 23+50. In each section, instrumentation was located to monitor the foundation, upstream and downstream shells and the impervious core. Throughout construction, data was recorded to provide information on the dam and foundation behavior to compare with design assumptions and to establish a baseline for post construction monitoring. A detailed report titled "End of Construction Report On Project Instrumentation, Little Dell Dam" has been prepared and should be consulted for a full understanding of the instrumentation system. The following information is a brief summary of the instrumentation and the behavior of the dam and foundation during construction.

12.1 CONTRACT VERSUS AS-BUILT INSTRUMENTATION

The geotechnical instrumentation specified by contract consisted of seventy one (71) high-air-entry filter vibrating wire piezometers, twenty one (21) high-air-entry filter Casagrande open tube piezometers retrofitted with small diameter vibrating wire transducers, two (2) temporary slotted PVC observation wells, thirteen (13) inclinometers, thirty nine (39) surface survey monuments, five (5) accelerographs with enclosures, two (2) instrument houses, one (1) Parshall flume and one (1) V-notch weir. Adaptations, additions and changes were made to the instrumentation system during the course of construction. A summary of the instrumentation is presented as Table 13, Summary of Geotechnical Instrumentation. The instrument locations are shown on Plate 42, Plan View of Instrumentation and on the five (5) Instrumentation Sections, Plates 43 through 47.

12.1.1 Additions to Instrumentation

Additions to the original instrumentation system during construction are as follows:

Cofferdam Piezometers.

Based on recommendations by HQUSACE and CESPD Geotechnical Personnel, seven (7) temporary open tube piezometers were installed in the cofferdam foundation and two (2) temporary open tube piezometers were installed in the embankment. The installation was a precautionary measure in the event a pool formed. Water never ponded behind the cofferdam to any appreciable depth and these piezometers were abandoned and grouted as the subsequent embankment construction incorporated the cofferdam.

Upstream Foundation Piezometers.

During construction portions of the right abutment upstream Older Alluvium foundation were found to be wet and potentially weak and unstable. This portion of the foundation was bridged primarily with Random II material and construction continued. Two vibrating wire piezometer instrument pairs, VW-72 through 75, were installed at Station 19+00, 250 feet upstream, to monitor pore pressures in this section of the Older Alluvium foundation. VW-72 and 73 were placed in the clay above the upper gravel and VW-74 and 75 were installed in the clay above the basal gravel. Excess pore pressures were not detected by these instruments (VW-72 through 75) during construction.

Impervious Core Piezometers.

The VWPs installed under the contract were installed in a sand sack. Initial readings indicated that the water in the sand column was either being pulled into the bentonite seal or migrating out into the surrounding embankment. In order to better understand what these instruments were showing and to understand what kind of pore water pressures were actually being developed in the embankment during construction two (2) additional VWPs, VW-76 and 77, were installed in the core at Stations 13+10 and 20+55 respectively. These were Geonor Model M-600 piezometers with high-air-entry filters designed for direct burial in the embankment. Excess pore pressures were not detected by VW-76 or VW-77 during construction.

Left Abutment.

An observation well was installed in the left abutment approximately 100 feet downstream of the impervious core. An exploratory drill hole, 1F-78, was initially fitted with a slotted section during preconstruction explorations and used to monitor water levels. This existing piezometer was located and a riser was extended up through the embankment. The addition of this instrument increases the capability to monitor potential end around seepage in the permeable conglomerate and sandstone layers in the left abutment. The location of OW-3 is listed as Station 11+85, 118 feet downstream.

Embankment, Downstream Shell.

Surface survey monument M-34 was relocated and two additional monuments, M-34A and M-34B, were added on the downstream dam face in the vicinity of the old landslide that is located in the right abutment downstream foundation. This provided additional monitoring in the area of the embankment above the relic landslide.

Left Abutment - Downstream Ravine.

It was recognized there is a potential that seepage through the left abutment could exit the ground in the ravine located on the left abutment approximately 1500 feet downstream of the embankment. A spring already exists in this low point and a V-notch weir (W-2) was added to monitor flows. It should be noted that at high pool levels, water trapped in the left abutment conglomerate layer behind the montmorillonite layer may emerge in the ravine. This is because the conglomerate exposure at this location outcrops at a relatively low elevation with respect to high reservoir pool elevations.

12.2 INSTRUMENTATION LOSSES

Overall, the Contractor was very careful with the instrumentation and no irrepairable damage occurred due to construction activity, even though four inclinometer splices, two open tube splices and numerous vibrating wire cable splices were required. However, there were a few temporary and permanent losses. Four (4) open tube piezometers, (C-2, C-5, C-10, C-19) were lost and two (2) open tube piezometer installations, (C-14, C-15) were heavily damaged because of a design flaw that caused the PVC risers to be bent or sheared off inside the protective casing. Coverage was not lost because these locations have a vibrating wire piezometer backup. A vibrating wire pair, (VW-41 and 42) are considered lost because of their behavior after installation. The apparent large linear increases in pore pressure measurements are unreasonable and indicate these instruments may be damaged and unreliable. Two additional vibrating wire pairs, (VW-61 and 62 and VW-67 and 68) were rendered useless for construction monitoring because of inappropriate installation procedures. At both locations extremely high excess pore pressures were recorded immediately after installation. The excess pore pressures appear to be dissipating such that with time these instruments may eventually provide good data with respect to embankment seepage. A summary of installed, lost, damaged and surviving instrumentation is included on the five (5) Instrumentation Sections, Plates 43 through 47.

12.3 GEOKON TRANSDUCER PROBLEM

During the final stages of the project it became apparent there was a significant problem with the smaller diameter Geokon transducers that are retrofitted into the open tube piezometers and observation wells. A few of the transducers gave false readings and upon inspection it was discovered the stainless steel tips had rusted. The Geokon steel tips were replaced with ceramic tips in those open tube piezometers where the transducers were accessible. The replacement occurred in the fall of 1993 after the dam had been completed.

12.4 FOUNDATION AND EMBANKMENT PERFORMANCE

Foundation and embankment performance during construction, as indicated by the instrumentation readings, are discussed in this section. In general, the recorded data and field observations indicate the embankment and foundation performed as expected and the embankment remained stable throughout construction. Nonetheless, there were individual instrument readings that prompted closer scrutiny and more frequent readings. These unusual or aberrant readings are discussed in the following sections. For a better understanding refer to the Plan View of Instrumentation Plate 42, the five (5) Instrumentation Sections, Plates 43 through 47, and the data summaries included in Appendix V, Instrumentation Data Summaries.

12.4.1 Foundation Piezometers

Piezometer data was obtained from instruments installed in the bedrock and soil foundation. The piezometer data indicated there was little excess pore pressure buildup in the bedrock foundation and that pore pressure increases occurred only in the softer more compressible rock units under the maximum embankment section. Refer to the piezometer data for VW-17 and 18 and VW-22 and 23 near the dam axis, Station 15+50 in Appendix V.

Excess pore pressure was measured in the Older Alluvium soil foundation under the upstream shell. This area of the foundation on the right abutment between Station 17+00 and 22+00 was identified as having the weakest foundation materials. Additional vibrating wire piezometers were installed at two locations such that a total of four separate locations could be monitored. Relatively small (less than 10 feet) excess pore pressures were measured at two of the four locations. Refer to the piezometer pair data for VW-27 and 28 at Station 18+00, 180 feet upstream and VW-47 and 48 at Station 20+50, 100 feet upstream in Appendix V.

12.4.2 Embankment Piezometers

Piezometer data was obtained from instruments installed in the Random I, Random II and Impervious Core embankment zones. The data indicates that excess pore pressures did develop in the lower elevations of the embankment particularly within the impervious core. However only at one location, VW-67 and 68, at Station 23+50, 5 feet downstream did the excess pore pressure appear dangerously high. At this location the elevated pressures are thought to be the result of an installation problem and representative of just a small zone in the vicinity of the borehole. The embankment piezometer responses during construction are summarized on Table 14, Summary of Embankment Piezometer Response during Construction.

12.4.3 Foundation Settlement (Vertical Movements)

Bedrock deformation or settlement beneath the embankment was estimated by obtaining the difference in elevation of the fixed open joints in each of the inclinometer casings. The fixed open joints are located in the foundation below the top of rock. Readings were taken only at the beginning and end of the 1992 construction season. The 1992 season data was then extrapolated to obtain an estimate of the total bedrock deformation or settlement that occurred

during the entire construction period. The data indicates that the highest deformation occurred under the maximum Random II, upstream shell section in the old streambed valley portion of the foundation and less deformation occurred under the Random I downstream shell. The total maximum bedrock deformation or settlement is estimated to be between 0.4 and 0.5 feet near the maximum section at approximately 100 to 150 feet upstream of the dam axis.

An estimate of soil foundation settlement or consolidation was obtained for the Older Alluvium foundation materials on the right abutment. The estimate was derived from an evaluation of inclinometer joint closure data. The data indicates that for a 30 to 40 feet sequence of Older Alluvium, total settlement or consolidation of the layer ranged from about 5 to 10 inches. About 7.5 to 9.5 inches of settlement or consolidation was measured under the upstream Random II shell and about 5 to 6 inches of settlement or consolidation was measured under the downstream Random I shell. This difference in the upstream and downstream settlement is reasonable in light of the significant differences in unit weight of the shell materials and the softer and initially wetter foundation soil conditions of the upstream right abutment.

12.4.4 Embankment Settlement (Vertical Movement)

Estimates of embankment settlement, compression plus consolidation, were derived from an evaluation of inclinometer settlement joint data obtained at thirteen (13) locations. The data suggests that the Random II upstream shell is significantly stiffer or less compressible than either the Random I downstream shell or the adjacent Impervious core. Within the Impervious Core zone the maximum total settlements recorded at the five (5) instrumentation sections ranged from about 29 to 71 inches at the maximum fill section. In comparison, the maximum total settlement recorded at the instrument sections in the Random I and Random II shells ranged from 7 to 35 inches and 6 to 20 inches respectively. Refer to the sheet titled "Total Settlement Summary (Inches) through End of Construction" in Appendix V, Instrument Data Summaries.

An unusual settlement was recorded in the embankment, particularly in the Impervious Core zone at Stations 15+50, 18+00 and 20+50, between approximately elevation 5650 and 5660 feet. Settlement in this portion of the embankment was not observed until the beginning of the 1992 construction season. The reason for this unusual settlement and some associated horizontal movement is unknown. Refer to the Summary of Inclinometer Data sheets in Appendix V.

12.4.5 Foundation Movements (Horizontal)

Horizontal movements within the foundation were monitored with inclinometers at thirteen (13) locations. The reported incremental movements are changes recorded at discrete measuring points. The reported cumulative movement represents the total movement at any elevation relative to the bottom of the inclinometer casing installed into the bedrock foundation.

There has not been any measured horizontal bedrock foundation movement at the inclinometer locations. The largest soil foundation movements were recorded in the Older Alluvium foundation on the right abutment along Stations 18+00 and 20+50. The maximum measured incremental movements ranged from 0.1 to 0.2 inch and the maximum measured cumulative movement range from 1.0 to 3.3 inches. The maximum movements apparently

occurred at material boundaries such as the Older Alluvium to bedrock and Older Alluvium to embankment contacts or within the Older Alluvium at the clay to gravel boundary. The soil foundation behavior was closely monitored during construction. However, the rate and magnitude of the recorded movements was never large enough to indicate the onset of a mass movement.

12.4.6 Embankment Movements (Horizontal)

Horizontal movements within the embankment were also measured at the thirteen (13) inclinometer locations. In the upstream shell the measurements indicate the shell generally tended to move horizontally toward the maximum embankment section and downstream. At the thicker upstream fill sections there was also a trend indicating the lower portions "bulge" in an upstream direction. The measured incremental movements were generally less than 0.1 inch and the maximum measured cumulative movement or bulge was approximately 1.0 inch at inclinometer I-6, Station 13+00, 240 feet upstream. In the downstream shell there are two distinct movements that appear to be strongly related to settlement. The measurements indicate the downstream shell generally tended to move toward the maximum embankment section and downstream. The downstream movement appears as a distinct bulge on the cumulative movement plots. The maximum cumulative movement toward the maximum embankment section was approximately 2.5 inches at I-8, Station 13+00, 200 feet downstream. The maximum downstream cumulative movement or bulge was nearly 4.5 inches at I-11, Station 15+50, 300 feet downstream. The measured incremental movements were generally no greater than 0.1 to 0.2 inch. In the impervious core the measurements indicate there are three distinct movements or trends. One trend is the apparent downstream movement of the upper half of the core. However, in relation to the lower elevation movements the upper portion has moved in the upstream direction. The maximum measured cumulative movement in this upper portion of the core was 2 inches in I-10 at Station 15+50. A second trend or movement is a settlement related movement towards the maximum embankment section. The maximum measured cumulative movement of this type was 3 inches measured in I-7 at Station 13+00. The third observed movement is an apparent abrupt displacement in the downstream direction at the core to foundation interface. Here the maximum measured cumulative movement was nearly 3 inches in I-10 at Station 15+50. There was also an unexplained apparent abrupt movement in I-10, I-13, and I-16 at approximately elevation 5652 feet. This movement may be related to the settlement that occurred and was recorded at elevation 5652 feet. In general, measured incremental impervious core movements were generally less than 0.1 inch; the maximum incremental movements ranged from about 0.1 to 0.3 inch.

12.4.7 Seepage

Prior to and during construction, a spring emerged on the downstream right abutment. This spring was captured and its discharge routed through a V-notch weir (W-1) located about Station 21+42 and 485 feet downstream of the axis, just beyond the dam toe. The flow is then conveyed to the plunge pool via the rock lined ditches and the downstream catch basin. During construction several springs were encountered within the dam footprint, particularly along the base of the left abutment. Flow captured by the drain blanket is discharged via the collection system through the manhole and outfall pipe to the Parshall Flume located

about Station 12+22 and 1653 feet downstream of the axis. Based on the recorded flows, it appears precipitation and ground water recharge of the left abutment bedrock formation influence or add to flow measured at the Parshall Flume. At the end of the 1992 construction season the "stabilized" baseline flows measured at the Parshall Flume and the Spring Drain Weir (W-1) were approximately 0.045 cubic feet per second (20 gpm) and 0.003 cubic feet per second (1.4 gpm) respectively.

12.4.8 Survey Monuments

Survey monument installation was often postponed or hindered by construction activities. After installation, accessible monuments were intermittently monitored as time and resources permitted. The resulting survey data indicated the monuments on and off the embankment were relatively stable and did not move significantly throughout construction. Frequent inspections confirmed the embankment was stable.

12.5 ANTICIPATED FOUNDATION AND EMBANKMENT PERFORMANCE

12.5.1 Foundation Piezometers

The geology of the foundation is very complicated and thus predicting reservoir induced piezometric levels is very difficult. However, it is anticipated that 1) piezometric levels in the left abutment will respond quickly and be higher than levels in the right abutment due to the highly fractured rock, 2) bedrock piezometers upstream of the grout curtain will respond directly to reservoir changes more so than those downstream of the grout curtain, 3) piezometers in the Older Alluvium soil foundation under the upstream shell are expected to become saturated and respond directly to reservoir changes and 4) piezometers in the Older Alluvium soil foundation under the downstream shell are not expected to be influenced by reservoir pool.

12.5.2 Embankment Piezometers

A majority of the upstream shell has a low permeability (10^{-7} cm/s) but there are lifts or zones of material estimated to have significantly higher permeability. Couple this material variation with the normal reservoir pool level fluctuations and it becomes difficult to accurately predict piezometric levels in the upstream shell and impervious core. Nevertheless it is likely that portions of the upstream shell and impervious core will become saturated over the life of the project. By contrast, the downstream shell should never become saturated because of the chimney drain and drain blanket beneath the downstream shell.

12.5.3 Foundation Settlement

Additional settlement or consolidation of the Older Alluvium foundation material is expected to be no greater than 2 inches. Additional minor bedrock foundation deformation is also likely as the rock continues to adjust to the imposed embankment loads.

12.5.4 Embankment Settlement

The rate of embankment settlement has dropped off rapidly since the end of construction. The maximum post-construction settlement rate for the core was approximately 3 to 4 inches per year in 1993. Settlement rates in the upstream and downstream shell were considerably less. Additional settlement at the maximum sections should not exceed 9 inches.

12.5.5 Foundation Movements (Horizontal)

Little or no horizontal bedrock foundation movement is expected. The Older Alluvium soil foundation may continue to "creep" in response to changing loads and soil moisture (saturation). The magnitude of future horizontal soil foundation movement is difficult to estimate. Nonetheless, additional cumulative horizontal movement should not exceed 3 inches.

12.5.6 Embankment Movements (Horizontal)

It is anticipated the horizontal embankment movements will be related to the ongoing settlement and reservoir loads. Movements related to settlement or reservoir imposed loading will be minor. Incremental movements should be less than 0.1 inch. Cumulative movements should be less than 1.0 inch.

12.5.7 Seepage

Reservoir induced seepage will increase or decrease with fluctuating reservoir pool elevation. Seepage through the left abutment may be captured by the drain blanket and be measured at the Parshall Flume. End around seepage through the left abutment may exit far downstream and be monitored at a V-notch weir (W-2) installed after construction in a ravine downstream. Seepage through the right abutment may influence the flows at the spring drain and be measured at a V-notch weir (W-1). In October 1993, at a reservoir pool elevation of about 5755 feet, measured flow at the Parshall Flume, Spring Drain Weir (W-1) and Left Abutment Ravine Weir (W-2) were approximately 0.3 cubic feet per second, 0.03 cubic feet per second and 0.1 to 0.15 cubic feet per second respectively. Normally flow through the Parshall Flume should not exceed approximately 1.0 cubic feet per second based on the historical flows to date. Future spring drain (W-1) and left abutment ravine (W-2) flows can not be accurately estimated at the time of this report (i.e. early 1994).

12.5.8 Survey Monuments

Accurate location surveys of the surface monuments will provide the clearest indication of how the embankment is performing. All monuments are expected to be stable. Nonetheless, the survey monuments on the embankment will indicate minor continuing settlement, a gradual downslope movement (creep) of the topsoil or riprap and a "flexing" of the embankment in response to reservoir pool loads.

13.0 EMBANKMENT STABILITY

Stability analyses of the dam were performed using the shear strength test results obtained from the record samples collected during construction. The stability analyses were performed on the "as-built" dam cross section at maximum height (Station 14+50). Although the foundation rock line exists very near the embankment contact at Station 14+50, for conservatism, it was assumed that the foundation consists entirely of clay (CL). The potential failure arcs and associated minimum factors of safety are shown on Plate 37. Table 9 includes a summary of the factors of safety required and the factors of safety determined during design and those determined using the "as-built" strengths at maximum embankment section.

13.1 END OF CONSTRUCTION

The minimum calculated end-of-construction factor of safety was 1.29. This compares to the required factor of safety of 1.3. A followup end-of-construction analysis using actual site conditions, ie. with the actual rock foundation line at this Station (14+50) resulted in a factor of safety of 1.59. It is concluded that the effective end-of-construction minimum factor of safety is essentially equivalent to or exceeds a factor of safety of 1.3. Refer to Plates 37 and 39.

13.2 SUDDEN DRAWDOWN

The condition which controlled the design of the upstream slope was sudden drawdown. Sudden drawdown slope failure can occur as a reservoir pool is lowered when drainage of the saturated upstream shell lags the drawdown rate of the reservoir. Sudden drawdown was analyzed for drawdown from the spillway crest (elev. 5798 feet) to inactive pool (elev. 5668 feet). The minimum factor of safety identified in Design Memorandum No. 10 was 1.18. This essentially meets the required minimum factor of safety of 1.2. As shown on Plate 26, the selected "as-built" shear strength for the Random II material is slightly less than the design strength, ie. 34° versus 36° for the "S" strength and 15° versus 19° for the "R" strength. The lesser "as-built" shear strength resulted in a minimum factor of safety during sudden drawdown of 1.17. However, a reanalysis was performed using recently published Corps guidelines for the sudden drawdown condition. The program used was UTEXAS3, which is based on procedures developed by Lowe and Karafiath. This recent guidance takes into account the effects of anisotropic consolidation prior to drawdown. Shear strengths along the failure plane are determined based on the effective principal stress ratio for each slice at consolidation. As previously stated, a check of the critical failure arc as determined with the old procedure, which uses the combined "R" and "S" envelope, yielded a minimum factor of safety of 1.17. Reanalysis of approximately the same critical failure arc using UTEXAS3 resulted in a factor of safety of 1.35. Infinite slope calculations indicate an absolute minimum factor of safety of 1.12 for the slope above elevation 5735 feet where the slope is 1V on 3H and 1.40 for the slope below elevation 5735 feet where the slope is 1V on 3.75H. Infinite slope type failures typically involve very shallow planner failures. Therefore, in the unlikely event that an upstream infinite slope type failure did occur, it would be very shallow. Refer to Plates 37 and 38.

13.3 STEADY SEEPAGE

The shear strength envelope chosen for the steady seepage stability condition was the selected "S" strength for "S" less than "R" and the intermediate envelope for "S" greater than "R." The selected "S" and "R" envelopes are shown for the Random I, Random II, and Impervious Core material on Plates 22, 26, and 32 respectively. The steady seepage condition evaluates the stability of the downstream slope of the embankment with an estimated steady seepage phreatic line. As indicated on Table 9 and Plate 37, the minimum factor of safety for this condition was computed as 1.60 which exceeds the minimum requirement of 1.5. See also the steady seepage flow nets depicted on Plates 40 and 41.

13.4 PARTIAL POOL

The shear strength envelope used for the partial pool condition is identical to that used for the steady seepage condition. The partial pool analysis evaluates stability of the upstream slope of the embankment for various pool levels. Several trial pool levels were evaluated for this condition. The minimum factor of safety was determined to be 1.79, which exceeds the required 1.5. This minimum factor of safety failure arc passes through the slightly weaker Random IV zone in the upper portion of the embankment. Potential failure arcs and associated factors of safety are shown on Plate 37. It is noted that the deeper arcs have factors of safety in excess of *2.0.

13.5 DISPLACEMENT

Embankment displacement during earthquake loading based on Newmark analysis is described in Design Memorandum No. 10. Calculations indicate a maximum theoretical displacement of 3 feet. The maximum theoretical displacement was determined for the end-of-construction condition of the downstream slope. Since the end-of-construction shear strength properties and geometry of the embankment are essentially equivalent to those used in design, no additional analyses were performed. Estimated displacement for other loading conditions are much less than that determined for the end-of-construction condition and therefore were not reevaluated.

14.0 CONSTRUCTION

14.1 MODIFICATIONS, FIELD CHANGES AND ADAPTATIONS

14.1.1 Embankment Geometry

Except for the crest section, that portion of the embankment above elevation 5798 feet, the dam was built to the designed slope geometry. The crest section and top of dam access road pavement section were redesigned to accommodate the designed 0 to 2 foot overbuild. The redesign resulted in upstream and downstream slopes that vary from about 1.75H to 1.0V to 2.0H

to 1.0V. Refer to the As-Built embankment sections and the crest detail provided in the Plates. Although the Random and Waste fills at the upstream and downstream toes were included in the design, it is important to note the As-Built elevation of these fills with respect to the actual toe of dam.

14.1.2 Embankment Sequencing

The design envisioned there would be two embankment construction seasons after diversion through the outlet works. The embankment would be constructed from "the bottom up", with all zones being advanced simultaneously. The actual construction was accomplished in three construction seasons with numerous small partial fill sections throughout the first two construction seasons. Most significantly, the Contractor was allowed to construct the upstream "cofferdam" section with diversion accomplished by pumping "around" through the spillway, or through ditches and pipes across the right abutment foundation. The minimum embankment elevation required at the end of the first construction season was reduced from elevation 5705 to 5685 feet. Refer to the Construction Chronology, Table 5 for the detailed sequence of construction events.

14.1.3 Upstream and Downstream Shell Foundations

a. Dewatering of the foundation was accomplished through the installation of numerous sumps, ditching and pumping. The sumps were located to dewater localized springs and were constructed using 24 to 48-inch diameter CMP with Drainage Fill I gravel and Transition I and II sand. Sumps in the core trench and upstream of the axis were grouted when abandoned. Sumps downstream of the core were backfilled with gravel or sand and separated but not sealed or isolated from the horizontal (blanket) drain. There were fourteen (14) sumps constructed at the following locations: (A plus [+] indicates upstream of the axis; a minus [-] indicates downstream of the axis) Upstream at Station 13+09 and +737, Station 13+79 and +677, Station 13+45 and +372, Station 14+21 and +185, Station 14+15 and +112; Downstream at Station 14+58 and -220, Station 14+27 and -266, Station 14+11 and -326, Station 14+21 and -542, Station 13+50 and -631, Station 13+10 and -745; and in the Core Trench at Station 13+95 and -27, Station 22+01 and +39 and Station 22+93 and +20. Wet spots or slow seeps in the foundation were often treated with dry cement or covered with dry fill prior to general embankment placement.

b. The design envisioned leaving inplace and proof-rolling recent alluvium in the upstream and downstream foundation areas. In many locations the excavation and cleanup exposed formation (bedrock) at the streambed area foundation elevation. The Younger Alluvium was completely removed in the upstream streambed foundation area from the core boundary to approximately 170 feet upstream of the axis. In addition an area on the downstream right abutment between approximately Station 16+25 and 17+50, and offset 200 and 500 feet downstream, was found to be underlain with soft compressible fine grained soils. This area was overexcavated and the valley bottom subsequently widened as the unsatisfactory foundation material was removed.

c. It was expected that portions of the upstream right abutment fine grained Older Alluvium, between about Stations 17+00 and 22+00, would be soft or weak. During final excavation softer, wetter materials were actually encountered. Localized areas that did not stabilize during proof-rolling were bridged over with the initial embankment lifts and or crushed cobble. Four additional vibrating wire piezometers (VW-72 through VW-75) were installed in the foundation at Station 19+00, 250 feet upstream to supplement the instrumentation at Stations 18+00 and 20+50 in this area.

d. A relic landslide was encountered in the downstream right abutment foundation between approximately Stations 22+60 and 25+00, in an area 100 to 300 feet downstream. The slide was not recognized until after a portion of the slide mass was removed during final excavation. The slide was explored with two (2) trenches. It was determined the slide consisted of relatively strong incompressible material and the slide plane and geometry was favorably oriented with respect to the abutment and embankment. The remaining slide material was left in place. The exploration trenches were backfilled with Drainage Fill I gravel to the foundation surface and the base of the horizontal (blanket) drain.

e. The bottom of the major ravine crossing the right abutment was found to be underlain with a thick layer of topsoil and soft sediments. The ravine bottom was overexcavated and the side-slopes shaped to remove unsatisfactory foundation materials and provide access for construction equipment.

f. The Contractor located a diversion ditch and haul road across the right abutment. Restoration or remediation of these features resulted in some foundation overexcavation and additional shaping of the abutment.

g. Large open joints in the downstream foundation (primarily at the left abutment) were backfilled with sand and/or gravel before placement of the horizontal (blanket) drain.

14.1.4 Core Trench Invert

a. Preparation of the core trench invert was accomplished in general accordance with the Plans and Specifications. Considerable engineering and geologic judgment was exercised in directing the dental treatment. Treatment was a function of the location, orientation, nature, size and length of the joints and the elevation, orientation, shape and properties of the rock and adjoining beds. The tendency was to be less critical with respect to mortaring of short, random, filled joints as the embankment elevation increased.

b. Most joints identified at the core trench invert were mortared. Some beds or portions of beds that were intensely jointed, exhibiting tight or extremely small aperture fractures, were final cleaned with high pressure air, but not mortared. All deteriorated, slaked, loose surficial material was removed immediately prior to embankment placement. Large open joints (primarily at the left abutment) were backfilled to full depth with mortar or grout. Grout nipples were installed into selected large joints and the joint and vicinity were pressure grouted.

c. Most overhangs identified at the core trench invert were shaped. Shaping was achieved by either excavation or the construction of a concrete fillet. Short, discontinuous overhangs that were not accessible to wheel rolling or not adversely oriented were filled with wet hand compacted abutment clay.

d. During the 1991 season it was decided the Contractor should be compensated to do dental treatment in the softer rock units. A modification was issued covering dental treatment of the core trench invert and some additional treatment to the upstream core trench cut-slope. Work was accomplished as outlined in the Modification, Additional Dental Treatment, P00040.

e. Grout nipple embedment depth was selected based on the rock type, quality and location. Deep (4 to 6 feet) grout nipples were excavated prior to final cleanup. The post grouting excavation of the grout nipples in the core trench did not always extend to below the nipple tip elevation. The depth of excavation was adjusted to minimize damage or disturbance to the grouted foundation. Generally, the depth of excavation was within plus or minus 1.5 feet of the tip elevation. Nipples left in place were cut off flush with the foundation.

f. Some areas of the core trench invert were rugged after final cleanup was accomplished. Concrete "leveling" placements were used to facilitate core placement, assure core quality and promote the embankment placement schedule and progress. Concrete was used liberally between Stations 14+00 and 16+00 to accelerate "getting off the bottom".

14.1.5 Upstream Shell

a. In general, the Random II upstream shell was constructed in accordance with the Plans and Specifications. District Guidance permitted some flexibility or relaxation in the design requirements and thus allowed some variation in the specifications with respect to moisture control, gradation, percent gravel, compaction and zone changes. In the 1992 construction season there was a significant increase in the percent of oversize stone allowed, loose lift thickness was often slightly thicker than the specified 12 inch maximum, roller speed increased and a rezonation occurred. The rezonation allowed placement of Random I type material in a zone above elevation 5755 feet in the upstream shell. The actual rezoned placement occurred between elevation 5765 and 5786.5 feet and was designated the Random IV zone. Refer to Modification P00069, Rezone U/S Embankment IV, 09/02/92. The accumulative effects of these changes and adaptations are reflected in the Construction Control Data and documented in the Plates, Tables and Appendix.

b. The Random II and Random IV to Impervious Core zone boundary was often adjusted to facilitate construction. Major boundary deviations are shown on the As-Built Embankment Sections. Minor (less than 5 feet) out of bounds placements were not documented. Most adjustments of zone boundaries occurred at or near the abutments to conform to the local topography.

c. At approximately elevation 5786.5 feet the Contractor announced at the field

level that the Random IV zone placement was terminated. Between approximately elevation 5786.5 and 5798 feet, the remaining portion of the permitted rezoned area, the upstream shell was constructed as an expanded Impervious Core zone and a reduced Random II zone. Zone boundaries were neglected in this portion of the embankment because technically it was a Random IV zone. The Impervious Core to Random II boundary shown on the As-Built drawings is an approximation based on field observations.

14.1.6 Impervious Core

Impervious Core was placed in general accordance with the specifications with two exceptions. These exceptions were, 1) the variance granted to use the Caterpillar 825C compactor and 2) the increase in allowable maximum loose lift thickness from 8 to 10 inches in 1992. District guidance also permitted some flexibility or relaxation in design requirements and thus specifications with respect to moisture control and compaction. The accumulative effects of these changes and adaptations are reflected in the Construction Control Data and documented in the Plates, Tables and Appendix.

b. The Impervious Core dimensions were often adjusted to facilitate construction particularly at the abutments. Between approximately Station 13+50 and 16+50 the Contractor was initially given permission to enlarge the Impervious Core zone to facilitate placement in the narrow valley bottom. The intent was to readjust the zone boundary back to the original design line as access and foundation geometry permitted. Failure to properly monitor or establish the zone boundary resulted in an Impervious Core wedge being built into the base of the upstream shell Random II zone. The wedge between Station 13+50 and 16+50 was constructed similar to and "followed" the wedge of core placed in the upstream portion of the core trench between Stations 16+50 and 20+50, except that between 13+50 and 16+50 the core material was placed against existing Random II material and not on foundation. The Impervious Core to Random II zone boundary was corrected when it became apparent the Impervious Core was wider than designed.

c. A design change was implemented substituting Impervious Core for Transition II sand in the Transition II wedge shaped backfill on the downstream side of the core trench. The expanded Impervious Core zone extended from approximately Station 19+65 across the Station 22 Fault to Station 24+65. This change was initiated for the benefit of the Contractor and the project schedule and progress. The section later reverted to the original design to again facilitate construction. This rezonation is apparent on the As-Built Embankment Sections.

14.1.7 Inclined (Chimney) Drain

a. The Inclined (Chimney) Drain was placed in general accordance with the specifications, but the geometry of the Transition II sand and Drainfill II gravel zones was affected by several changes or adaptations. In response to a VEP, Modification P00042, Reduce Chimney Drain Width, was issued. At approximately elevation 5625 feet (at Station 15+00) the drain width reduction or taper was started such that by approximately elevation 5660 feet the Transition II and Drainage Fill II would each theoretically be 8 feet wide. However, by the

Contractor's selected means and methods the zones could not be placed 8 feet wide. Typically, each zone was constructed 9 to 11 feet wide. This led to another adjustment to prevent encroachment into the Impervious Core. At about elevation 5695 feet the Transition II to Drainfill II boundary was taken vertical for approximately 20 feet before returning to parallel the downstream core boundary. This adjustment provided for wider (10 ± feet) Transition II placement while preventing encroachment into or narrowing of the Impervious Core. Encroachment of the Drainage Fill II into the Random I zone was not of engineering concern. Already mentioned was the modification of the Transition II core trench wedge on the right abutment. Lastly, the Drainage Fill II was terminated approximately 1-foot lower than the design elevation and covered with a layer of Transition II sand before Random II placement continued. The accumulative effects of these changes and adaptations are reflected in the Construction Control Data and documented in the Plates, Tables and Appendix.

14.1.8 Horizontal (Blanket) Drain

a. Similar to the Inclined Drain, the Horizontal (Blanket) Drain was locally field adapted. The Drainage Fill I gravel layer was thickened in the right side of the streambed area, and in the bottom of the right abutment ravine. The Drainage Fill I layer thickness was increased to 24 inches in the valley bottom from Station 16+75 to where the right abutment steepened. In the low area that resulted from the ravine excavation, the Drainage Fill I layer thickness was increased to 30 inches. Higher on the right abutment, the drain blanket was terminated at the toe by encapsulating or wrapping the Drainage Fill I layer with Transition sand. Thus, it is only between approximately Stations 16+35 and 24+00 that the Drainage Fill I layer daylights into the lined toe ditch. As with the chimney, the Drainage Fill layer at the abutments was terminated approximately 1-foot lower than the design elevation and covered with a layer of Transition sand before Random I placement continued.

b. Two aspects of the Horizontal (Blanket) Drain construction need mentioning. Both relate to the gradation of the materials placed. During the 1991 construction season there were several instances when the Drainage Fill I placed had particles covered with clay or silt. The fines content was generally low, but the eventual washing or migration of the fines to lower elevations may reduce the effective drain blanket thickness in localized low areas or partially silt-up the toe of dam seepage collection pipe. Periodically, the turbidity of the drain blanket discharge may increase slightly as a result of cleansing flows through new areas of the Drainage Fill I layer. However, given the volume of seepage and gradient operative during steady state flow conditions, assuming that this condition will occur, the migration of fines is exceedingly unlikely. Also, during the early part of the 1991 season (21 May to 11 June), Transition Fill I sand with excessive fines was placed in the streambed area between approximately Station 13+50 and 15+50 and between offset 200 and 750 feet downstream. Although the fines content of the sand was only 1 to 2 percent above the allowable 5 percent, based on field observations and percolation tests, the reduction in permeability was significant. Although anticipated to be minimal, it can only be speculated what effect this area of lower permeability Transition I sand may have on seepage. At other times and locations, Transition I sand with excessive fines was left on the abutments. Generally these occurrences were limited or localized to a single layer or lift and thus were considered nondetrimental to the function of the drain blanket. The changes,

variations and adaptations of the Horizontal (Blanket) Drain are documented in the Construction Control Data and the Plates, Tables and Appendix.

c. To construct the "three part" drain blanket on the steeper abutments the materials were independently placed outward from the foundation. As each strip of Transition or Drainage Fill was placed, the designed layer thickness was controlled by horizontal measurements determined by the slope angle. Once all three parts or zones were placed, the composite lift was compacted with concurrent coverages or passes overlapping the zones. After compacting the two Transition sand layers with the specified coverages, no attempt was made to compact the middle Drainage Fill I gravel zone. This methodology worked well and zone control was excellent.

14.1.9 Toe of Dam Subdrain System

a. The Toe of Dam seepage collection system is critical to the performance and stability of the embankment. It consists of an outfall pipe and two lateral slotted PVC collector pipes. The outfall and collector pipes "connect" in a manhole at the downstream toe. The outfall discharges into the Parshall flume about 900 feet downstream of the dam. The location, orientation and length of the collector pipes were changed from the original design. The right collector was shortened from about 150 feet to 99 feet and angled upstream with a 45° elbow at a point 27 feet away from the manhole. The left collector was lengthened from about 100 feet to 155 feet and angled upstream with a 45° elbow at a point 47 feet away from the manhole. The right side elbow is located at Station 14+79, 760.7 feet downstream of the axis at elevation 5562.1 feet. The right side terminates at Station 15+31, 710.6 feet downstream of the axis at elevation 5568.0 feet. The left side elbow is located at Station 13+99, 753.4 feet downstream of the axis at elevation 5565.3 feet. The left side terminates at Station 13+23, 674.5 feet downstream of the axis at elevation 5569.2 feet. The increased length of the left collector moved the end of the pipe to the base of the left abutment. This field adaptation took advantage of the resultant foundation shape and was influenced by the numerous springs and seeps encountered along the left side of the valley.

14.1.10 Downstream Shell

a. The Random I was placed in general accordance with the specifications with two exceptions. These exceptions are, 1) the variance granted to use the Caterpillar 825C compactor and 2) the increase in allowable maximum loose lift thickness from 8 to 10 inches in 1992. Although formally the allowable loose lift thickness was 10 inches, in practice the Contractor generally placed a 12 inch loose lift. District Guidance also permitted some flexibility or relaxation in the design requirements and thus allowed some variation in the specifications with respect to moisture control and compaction. The accumulative effects of these changes and adaptations are reflected in the Construction Control Data and documented in the Plates, Tables and Appendix.

14.1.11 Embankment Instrumentation

a. There were several instrumentation system changes or adaptations. A Modification, Piezometer Low Air Entry Filters (P00036), was issued to change the high air entry vibrating wire transducer and the Casagrande tips/stones to low air entry tips/stones. Four additional vibrating wire piezometers were installed in the upstream foundation. Two vibrating wire "direct burial" piezometers were installed in the Impervious Core. Observation well (OW-1) was extended. Observation well (OW-3) was added. Two surface survey monuments were added on the downstream shell. Refer to Section 12, Instrumentation, for more detailed information.

14.2 RECOMMENDATIONS AND CONSIDERATIONS FOR FUTURE PROJECTS

14.2.1 General

a. Do not award a contract solely on the basis of low bid. Require the prospective Contractor and key personnel assigned to the project to have sufficient prior experience. Add language to contract bid documents which allows rejection of unreasonable bids.

b. Staff the field/resident office adequately. Excessive overtime leads to declining safety, quality of work, health and morale.

c. Make Quality Control of the embankment the responsibility of the Government and Local Sponsor.

d. Involve the Local Sponsor in the actual day-to-day construction activities.

e. Prepare for project completion and turnover well in advance. (Recommend 1-year prior to estimated completion.)

f. Enforce the contract 100 percent, or prepare a change order modification.

g. If the Contract includes critical milestones or requirements, be explicit as to the consequences, burden or penalty to be assessed for nonperformance. Consider graduated reduction in payment for appropriate work items when noncompliance with the specifications equates to a shorter life cycle, but not necessarily loss of function or a failure.

14.2.2 Drawings and Specifications, General

a. Be careful about labeling and dimensioning the drawings. Dimensioning can lead to the conclusion that the design lines and grades are more accurate than intended. Where design is to be field fit, clearly indicate on the drawings and in the specifications.

b. Wherever possible, provide the Contractor with good illustrations (Contractors typically look first at the drawings for bidding and building, not the specifications.)

c. Make sure definitions and terminology shown on the drawings are exactly as appears in the specifications.

d. Avoid changing specifications and drawings in a last minute panic mode.

e. Explicitly state in the specifications the minimum acceptable Contractor Quality Control staff. The staffing requirements should include the organizational structure, the experience of the personnel and size of the staff. Require the major features of work to be the responsibility of an employee of the prime contractor. Prohibit subcontractors or other production people from being responsible for CQC. Include a survey crew as part of the CQC staff.

f. Include bid items and unit prices for equipment rental, including operator, for miscellaneous site work, explorations, and other unforeseen work performed at the direction of the Corps.

g. Provide the Contractor with an extensive summary of the information required for an acceptable Borrow Plan. Prohibit the Contractor from starting embankment placement until his Borrow Plan is submitted and returned with comment.

14.2.3 Foundation

a. Prohibit the Contractor from preparing the embankment foundation in a piecemeal fashion. Require that final excavation, dewatering, proof-rolling, etc. be performed in areas large enough to properly use the procedures developed and specified for embankment placement.

b. Require the Contractor to maintain survey stakes with station, offset, elevation, cut or fill over the entire dam footprint on a convenient grid.

c. As with the grouting, make core trench cleanup and foundation preparation "as directed" by the Corps of Engineers. Configure the bid schedule to permit the "as directed" work by the hour. Include an extensive list of the equipment needed to perform the cleanup and preparation.

d. Expand the discussion on dewatering. Cite means and methods appropriate for the site. Emphasize the condition of the foundation required for acceptance and embankment placement.

e. Outline the Foundation Approval process to include surveys, geologic mapping, photographs, documentation, remedial action (as needed), and the official and formal approval requirements to place embankment.

14.2.4 Embankment

a. Clearly specify the entire sequence of embankment placement including

processing and all restrictions on partial fills. Prohibit the placement of small partial fills that will result in the embankment being built in pieces.

b. If there are placement milestones for the embankment, emphasize these milestones and be explicit in explaining the ramifications and liquidated damages for not achieving those milestones.

c. DO NOT let the Contractor start work until the appropriate preconstruction surveys have been completed and verified by an independent source.

d. Require the Contractor to provide actual surveyed cross sections for payment that also show the contract design lines and grades. Overruns and underruns should be apparent.

e. Review the specified materials gradational bands. Assume the Contractor will try to produce a material that fits within the band regardless that the material is gap-graded or scalped of the larger sizes. Configure the gradational band to prohibit detrimental gradations. Consider specifying material sizes on a percentage with plus or minus tolerance format.

f. Be more specific about the size, methods, time and impact required to obtain record samples. Require the Contractor to supply manpower and equipment to assist in the retrieval of the samples. Include an appropriate bid item.

g. If Quality Control is the Contractor's responsibility, require the Contractor to perform ALL testing to comply with the specifications. Include an extensive reference list of tests and test frequencies acceptable to the Corps for each of the embankment materials.

h. If Quality Control is the Contractor's responsibility, strengthen the specifications with regard to the Government's role and Quality Acceptance testing. Leave no doubt as to whose tests and what tests will be used to determine the acceptability of the embankment. Discuss expected turn around time, frequency of testing and remedial action, if a failure occurs. Indicate that frequency of testing shall be increased under certain conditions (e.g. poor CQC, numerous continuing failures, etc.). To prevent the inevitable argument that a test is not representative or representative of only a small volume, specify the minimum lot, area or volume that will be reworked for a failing test.

i. Require the Contractor do the testing to prove the Government testing is in error, and don't let the Contractor use the CQC organization laboratory or testing to build a claim against the Government. Require that testing for claims be performed by an independent laboratory different than the CQC organization.

j. Government testing should include regularly scheduled exploratory trenches into the embankment. Much is revealed by a "look back" through the fill.

k. Specify stripping will be paid for only once.

l. Limit mixing and blending of materials on the embankment. Require the Contractor to mix and blend and moisture condition in the borrow area.

m. Prohibit mixing and blending on the embankment of materials of dissimilar gradation or dissimilar moisture content (e.g. dry on wet, rock and gravel on fines, etc.).

n. Prohibit the placement of thin lifts.

o. For any haul road or trafficked area of the embankment, restoration and removal should be clearly spelled out and described to include excavation, ripping, disking, moisture conditioning and recompaction requirements.

p. Define a loose lift. (e.g. measured after disking, with no wheel or track traffic). Specify disking as the last process before rolling.

q. Give considerable thought to how the fill should be controlled. Keep in mind the rate of placement for the full scale peak production. Configure the test fill program to develop quick methods of quality control.

r. Insist on the highest standards of excellence from the Government controlled laboratory and field testing. Their work will be intensely and continuously scrutinized as soon as a "failure" is reported.

14.2.5 Instrumentation

a. The contract should require the Contractor to provide qualified geotechnical personnel during instrumentation borehole drilling. Drillers logs are not accurate enough for evaluation of the foundation with respect to instrument performance.

b. The COE instrumentation staff should have been larger. For a project the size of Little Dell Dam with its' complex instrumentation system there should have been a dedicated staff throughout the construction phase of at least one (1) engineer and one (1) technician. During the busiest portion of the construction season it is recommended that an additional technician be provided. The staff should also be increased for multiple shift work schedules.

c. A thorough review of the purpose and locations of the geotechnical instrumentation should be coordinated with the geologists and engineers most familiar with the project during the design phase. For example, the foundation piezometers in the core trench are used to monitor the effectiveness of the grout curtain. These piezometers would provide more suitable data had they been installed along the geologic bedding so the same rock unit was being monitored both upstream and downstream of the grout curtain.

d. The installation of the geotechnical instrumentation should be performed through as little fill as possible. The shorter the installation boreholes the fewer problems encountered.

e. Piezometers in the embankment should be installed in separate protective casings from foundation piezometers.

f. The use of a three (3) part sand to one (1) part bentonite powder as a backfill material is not recommended in boreholes that contain water that cannot be removed. This mixture will bridge and can cause significant instrument installation problems.

15.0 OPERATIONAL NOTES

The embankment was topped out on 10 October 1992. Substantial completion was attained on or about 16 December 1992. Because of the probability the site would be snow covered at substantial completion, the Initial Periodic Inspection was conducted from 20 to 22 October 1992. In late 1992 and early 1993, interim Water Control, Operation and Maintenance, Initial Lake Filling and Emergency Action Plans were developed by the Corps of Engineers, Sacramento District, and the Local Sponsors in preparation for turnover. During this period the Corps allowed closure of the outlet works. Initial filling began on 15 January 1993 with approximately 1 cubic feet per second inflow into the reservoir. The Local Sponsors (Metropolitan Water District of Salt Lake City and Salt Lake County) accepted operations and maintenance responsibilities on 26 March, 1993. Except for lingering punchlist work, the project completion was accomplished by November, 1993. The Corps of Engineers will aid and assist the Local Sponsors, particularly with monitoring dam instrumentation until 30 September 1994. For complete details on the dam and appurtenances, review the documents referenced above and in this report's Appendix VI, References and Related Publications.

16.0 INITIAL LAKE FILLING

As previously stated, Initial Filling (pool raise) began on 15 January 1993. Initial inflow to the reservoir from Dell Creek was only on the order of 1 cubic feet per second. The reservoir was at approximately elevation 5649 feet when the spring runoff began in early March 1993. Parleys Creek was diverted on 11 May 1993, initially contributing an average 40 to 50 cfs to the pool. The peak inflow occurred in mid-May as a result of combined Dell and Parleys Creek flows during an unusually wet spring. The maximum daily change in pool elevation occurred 15 to 16 May 1993, peaking at about 2.3 feet per day. A seasonal maximum pool elevation of about 5757.5 feet was attained in August, 1993. A pool elevation of 5757.5 feet roughly corresponds to 12,000 acre feet of storage and 68 percent of the normal reservoir capacity. Early estimates of spring runoff indicate the reservoir may fill to the maximum normal pool elevation, 5785 feet, in 1994. To date the embankment and outlet works have performed as designed.

17.0 SUMMARY

The embankment was constructed in several phases over three separate construction seasons. Construction was accomplished in general accordance with the Plans and Specifications, approved modifications and Engineering Division guidance. The foundation, particularly within the core trench, was closely inspected and approved for embankment placement. Variations in embankment quality should not be detrimental to the overall performance of the dam. Observations and instrumentation data recorded to date indicate the embankment is performing as expected and in accordance with the design concepts.

TABLES

TABLE 1
EMBANKMENT & EXCAVATION QUANTITIES

ZONE/MATERIAL	BID QUANTITY (CY) (1)	APPROXIMATE AS BUILT QUANTITY (CY) (2)	PERCENT OVERRUN/ UNDERRUN
Random I D/S Shell	1,975,000	2,106,200	+ 6.6
Random II and IV [3] U/S Shell	2,060,000	2,066,900	+0.3
Impervious Core	535,000	563,100	+ 5.3
Transition Fill I Horizontal Drain	30,000	30,000	0.0
Transition Fill II Horizontal & Inclined Drain	158,000	107,700	-31.8
Drainage Fill I Horizontal Drain	60,000	58,700	- 2.2
Drainage Fill II Inclined Drain	96,000	72,400	-24.6
Riprap U/S Slope	56,000	55,800	- 0.3
Riprap Bedding	22,000	22,300	+ 1.4
Topsoil D/S Slope	30,000	27,000	-10.0
TOTAL	5,022,000	5,110,100	+ 1.75
Core Trench Excavation	30,000	24,000	-20.0
Reservoir Borrow Area Excavation	5,870,000	5,148,400	-12.3
Dam Foundation Excavation	345,000	304,000	-11.9

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ZONE/MATERIAL	BID QUANTITY (CY) (1)	APPROXIMATE AS BUILT QUANTITY (CY) (2)	PERCENT OVERRUN/ UNDERRUN
Foundation and Borrow Strip and Waste	450,000	450,000	0

Notes: (1) Includes the sum of a and b quantities for subdivided bid items.

(2) All quantities are affected by Contract Modifications and Field Changes to varying amounts.

(3) Random IV Quantity was about 65,000 cy.

TABLE 2
LITTLE DELL RESIDENT OFFICE
KEY PERSONNEL

ADMINISTRATION

Paul M. Parsoneault	Resident Engineer
Howie Aubertin (Dual role)	Assistant Resident Engineer
Joyce Lobsinger	Administrative Assistant
Roger Fulmer	Office Engineer

QUALITY ASSURANCE/ACCEPTANCE

Howie Aubertin (Dual role)	Chief
Carl Cole	Project Geologist
Michael Ramsbotham	Geotechnical Engineer
John Roadifer	Instrumentation Engineer

FIELD UNIT

Howie Aubertin	Chief, 1992
Marcelino Sanchez	Chief, 1989 to 1992
Ed Saldana	Lead Technician (Embankment) 1992
Michael Himes	Lead Technician (Grouting)

LABORATORY

Ed Saldana	Chief, 1989 to 1992 (C.O.E.)
Dave Anderson	Supervisor (Bingham Engineering)
Dave Calderwood	Supervisor (Bingham Engineering)

TABLE 3
PROJECT CONTRACTS

1. Core Trench and Test Fills
   Contract No. DACW05-88-C-0034
   Specification No. 8333
   Drawing File No. JO-3-25-35
   Contract awarded April 1988
   Contractor: Harper Contracting, Kearns, Utah

2. Dam and Appurtenances
   Contract No. DACW05-89-C-0045
   Specification No. 8426
   Drawing File No. JO-3-25-38
   Contract awarded May 1989
   Contractor: Clement Brothers Company and J. E. Starnes Co., a Joint Venture, Hickory, North Carolina

3. Riparian Mitigation
   Contract No. DACW05-91-C-0084
   Specification No. 8967
   Drawing File No. JO-3-25-42
   Contract awarded May 1991
   Contractor: Reclamation Engineering, Park City, Utah

TABLE 4
MAJOR SUB-CONTRACTORS ON CONTRACT NO. DACW05-89-C-0045

Name and Address	Construction Activity
Malta Construction and Tree Service 337 Mt. Yale Drive Leadville, CO 80461	Clearing & Grubbing
Boyles Brothers Drilling Co. P.O. Box 25068 Salt Lake City, UT 84125	Foundation Drilling and Grouting Tunnel Drilling and Grouting Instrumentation Drilling
Construct Tech 9620 South 500 West Sandy, UT 84070	Structural Concrete
George W. Johansen Construction Company P. O. Box 100 Mt. Pleasant, UT 84647	Parley's Creek Diversion Pipeline & Appurtenances
Rocky Mountain Fabrication 1125 West 2300 North Salt Lake City, UT 84116	Piping
Patrick Harrison Mining Company 10 Exchange Place, Suite 207 Salt Lake City, UT 84111	Tunnel and ECC Chamber Excavation and Support
California Steel Pressure Pipe 430 North 600 West Pleasant Grove, UT 84062	Concrete Cylinder Pipe
Slope Indicator P.O. Box C-30316 Seattle, WA 98103	Instrumentation Supplier

TABLE 5
CONSTRUCTION CHRONOLOGY [1]
(DAM AND APPURTENANCES)

DATE(2)		EVENTS and COMMENTS
		1988
April	1988	Core Trench and Test Fill contract awarded to Harper Contracting, Inc. of Kearnes, Utah.
September	1988	Core Trench and Test Fill contract work complete.
		1989
May	1989	Dam and Appurtenances contract awarded to Clement Brothers Co. and J. E. Starnes Co., a Joint Venture.
May	1989	Boyles Brothers performs exploratory drilling in the reservoir borrow area; Contractor looking for source of riprap, transition and drainage fill.
May	1989	Preconstruction meeting.
July	1989	Contractor explores the Reservoir Borrow Area for a source of transition and drainage fill material.
July	1989	Stripping of the dam foundation, right abutment initiated.
July	1989	Clearing and grubbing of portals initiated. Access road cut made near top of upstream portal.
July	1989	Stripping of Reservoir Borrow Area initiated.
August	1989	Excavation of the left abutment and the portals began. Access road and initial portal cuts made on or before 15 August 89. Initial top of downstream portal cut enlarged to provide access to I-4 on or before 22 August.
August	1989	Intake and cut and cover foundation work initiated with clearing, grubbing and stripping.
September (3)	1989	Excavation at the flood control intake initiated.
September (9)	1989	Downstream portal anchor drilling started.

DATE		EVENTS & COMMENTS
September (13)	1989	Construction of the spillway erosion control structures began.
September (13)	1989	Preliminary cleanup of the core trench invert began on or just before 13 September. Work began at the base of the haul road fill and progressed left towards the valley bottom, ≈ Station 16+00.
September (15)	1989	Upstream Portal anchor drilling started.
September (18)	1989	Foundation drilling and grouting initiated up the right abutment.
September (19)	1989	First rock anchors installed at the downstream portal.
September	1989	Rock plant components began arriving on site.
September	1989	Boyles Brothers began mobilization of the grout plant.
September (21)	1989	Excavation of the left abutment initiated. Access pioneered to top of core trench. Work effort focused on the upstream left abutment foundation.
September (25)	1989	First flood control intake fill placed.
October	1989	Shaping of the left abutment core trench invert (drill & shoot) initiated coincident with excavation of the downstream left abutment excavation.
December (5)	1989	Tunneling initiated with drill and shoot operations at the downstream portal. Spiling previously installed.
December (15)	1989	Downstream portal rock anchor and shotcrete work completed.

SUMMARY By the end of 1989 the right abutment had been stripped and the left abutment excavation was about 80% complete. Dell Creek had been "moved" but still flowed through the dam foundation (streambed area). Embankment was not placed this year.

1990

January	1990	Excavation of the downstream left abutment and streambed areas of the dam foundation continued. Foundation grouting and upstream portal work continues into the winter.

Table 5 - Page 3

DATE		EVENTS & COMMENTS
February (2)	1990	The crusher is cranked up for a shakedown run.
April (10)	1990	Start of the Embankment Construction Season. Excavation and preparation of the upstream right abutment, "ravine", area of the dam foundation is undertaken.
April (13)	1990	Upstream portal rock anchor and shotcrete work completed.
April	1990	Creek moved farther right in the upstream part of the dam foundation. CMP used for part of the diversion.
April (18)	1990	Embankment placement initiated with Random II in the upstream shell right abutment ravine area. Weather hampered work until about 10 May, after which good progress was made filling in the ravine.
May (1)	1990	Second tunnel heading started at the upstream portal.
May	1990	Excavation and preparation of the upstream streambed area of the dam foundation is accomplished.
May (18)	1990	Tunnel excavation and temporary support completed.
May (21)	1990	Embankment placement begins in the upstream shell at the left side of the streambed area. This partial fill later became the cofferdam.
June (23)	1990	Dell Creek diverted from the streambed area by pumping through a pipeline through the "ravine" on the right abutment. The Contractor was then able to pursue placement of Random II fill from abutment to abutment.
July	1990	Tunnel invert preparation and concrete floor mud slab placement initiated at upstream end of the tunnel.
July (14)	1990	Right abutment upstream shell foundation area finally excavated and prepared for Random II fill placement. Closure of the "cofferdam" on the abutment is now possible. Dell Creek must now be pumped around the work area.
July (20)	1990	Emergency Control Chamber excavation and temporary support completed.

Table 5 - Page 4

DATE		EVENTS & COMMENTS
August (9)	1990	Final preparation of the Core Trench invert begins in the old streambed area, approximately between Station 14+00 and 16+00.
August (15)	1990	Dell Creek Diversion relocated about this time to accommodate the advancing Random II, cofferdam, fill. The new location discharges into the spillway.
August	1990	Excavation of weak foundation materials at the Downstream right abutment streambed, old highway and ravine area accomplished.
August	1990	Boyles batch plant is demobilized. Grouting continues.
August (21)	1990	Tunnel invert concrete floor invert slab completed.
September (5)	1990	Concrete tunnel liner construction began.
September (13)	1990	Inclined Drain (Transition II) placement initiated.
September (21)	1990	Impervious core placement initiated.
October (4)	1990	Horizontal Drain Blanket placement initiated with placement of the Transition I layer.
October (31)	1990	Embankment placement suspended for the winter.
November	1990	Dell Creek diversion relocated. A ditch was excavated across the right abutment. Water is pumped to a high point at the upstream toe of dam and discharged by gravity flow through a ditch into the spillway.
December (20)	1990	Foundation grouting suspended for the winter,

SUMMARY At the end of 1990 embankment placement was about 9 percent complete. A small volume of the downstream shell had been placed. Most of the effort went into the RII upstream cofferdam. Impervious core placement was enough to effectively get out of the bottom. Foundation grouting was nearly completed. Significant progress was achieved in construction of the concrete tunnel liner.

1991

February (22)	1991	Concrete tunnel liner completed.

DATE		EVENTS AND COMMENTS
March	1991	Work on the downstream portal structures and cut and cover conduit is in progress.
March (1)	1991	Tunnel grouting initiated.
April	1991	Diversion now includes routing flow through the Outlet Works tunnel.
April (19)	1991	Start of the Embankment Construction Season. Excavation of the dam foundation resumes with work on the downstream left abutment.
April (25)	1991	Tunnel grouting suspended. Spring runoff being diverted through the tunnel.
May	1991	Foundation preparation resumes in the downstream streambed area.
May (16)	1991	Embankment placement resumes with horizontal drain blanket.
May (22)	1991	Random II embankment placement resumes with work in the upstream ravine area.
June (4)	1991	Foundation grouting resumes.
June (14)	1991	Random I embankment placement resumes.
June (28)	1991	Foundation grouting completed.
July (1)	1991	Restoration of deteriorated core initiated.
July (3)	1991	Core trench invert cleanup and preparation resumes.
July (4)	1991	Final foundation preparation and impervious core placement resumes at the right abutment.
July (12)	1991	Tunnel grouting resumes.
July	1991	Foundation excavation and preparation and embankment placement now occurring in all zones. Toe drain pipe installation at downstream toe completed.
August	1991	Parleys Creek diversion excavation and foundation backfill accomplished. Work on the structure begins.

DATE		EVENTS AND COMMENTS
August (8)	1991	Inclined (chimney) drain Transition II and Drainage Fill II widths reduced.
August (20)	1991	Impervious core material placed in the Transition II zone downstream of the core. Change occurred at about Station 19+65.
August	1991	Haul road across the IC zone removed and moved up the right abutment. (Location had inhibited and impacted impervious core placement.)
October (22)	1991	Embankment placement operations halted by onset of winter weather. Contractor attempts to winterize and protect the embankment.
October (31)	1991	Tunnel grouting completed.
SUMMARY	At the end of 1991 embankment placement was about 42 percent complete. Tunnel and foundation grouting were complete.	

1992

February	1992	Exit channel and plunge pool construction began.
March (13)	1992	Start of the Embankment Construction Season. Restoration of the embankment begins with work in the Random II zone. Random II placement follows soon thereafter.
March (31)	1992	Restoration of the Random I zone and Random I placement initiated.
April	1992	Restoration of the impervious core accomplished. Impervious core placement initiated.
April (16)	1992	Preparation of the core trench invert and final cleanup initiated.
April	1992	Final excavation, foundation preparation, and embankment placement occurring in all zones.
May (7)	1992	Right abutment haul road phased out. Temporary crossings over the Impervious Core and Inclined Drain were then constructed using fill or old railroad cars.

DATE		EVENTS AND COMMENTS
June (11)	1992	Construction of the Transition II wedge reverted to original design at approximately Station 23+75. Inclined (chimney) drain zones to be placed vertically for 20 feet to adapt for IC to TII zone boundary irregularity.
June (24)	1992	Riprap and bedding placement on upstream face of dam initiated.
September (8)	1992	Random IV zone, upstream shell placement initiated, Elevation 5765' to 5770'.
September (17)	1992	Horizontal Drain completed.
September (20)	1992	Random IV zone, upstream shell placement ends, elevation 5789' to 5790'.
September (25)	1992	Inclined drain completed.
October (5)	1992	Last Impervious Core placement on the left abutment.
October (7)	1992	Last Impervious Core placement on the right abutment.
October (10)	1992	Dam "topped" out.
November (15)	1992	Riprap completed on face of dam.
December (2)	1992	Spillway riprap stone protection completed.
December (16)	1992	Project considered substantially complete.

SUMMARY The project was substantially complete at the end of 1992. However, a substantial punchlist needed to be addressed.

1993

October	1993	Top of Dam Access Road paving completed.
November	1993	Project practically complete. Some punchlist items still outstanding.

Notes: (1) Refer also to the photographs, which are arranged chronologically.
(2) Dates provided are approximate.

TABLE 6

EMBANKMENT DATA

General

Type	Rolled, Zoned earthfill built in three stages (three construction seasons).
Zones	Riprap and bedding on upstream face, Random II & IV upstream Shell, Impervious Core, Inclined (Chimney) Drain, Horizontal (Blanket) Drain, Random I D/S Shell, Topsoil on D/S face.
Total Volume	Approximately 5,110,100 CY.
Actual Construction	Approximately 18 months.
Alignment	N 39° 17' 12.4" W.
Crest Elevations	5813.0 ft, NGVD (without overbuild).
Foundation Elevation:	
Upstream Toe	5599 ft, NGVD.
Axis	5575 ft, NGVD.
D/S Toe	5560 ft, NGVD.
Maximum Height at Axis	238 feet.
Maximum Width at Base	1475 feet.
Crest Length	1745 feet, Station 10+39 to 27+84.
Crest Width	30 feet.
Paved Width	16 feet.
Overbuild	Varies 0 feet at abutments to 2 feet at maximum section.
Downstream Slope	3H to 1V generally, 1.75H to 1V to 2.0H to 1V above elevation 5798 feet.
Upstream Slope	3.75H to 1V lower slope below elevation 5735 feet, 3H to 1V between elevation 5735 feet and 5798 feet, 1.75H to 1V to 2.0H to 1V above elevation 5798 feet.

Table 6 - Page 2

Upstream Shell

Random II Material	A coarse grained material with 13.6% cobbles, 35.7% gravel, 25.8% sand and 24.9% fines on the average.
Random IV Material	Located in the upstream shell, this material is fine grained with 0.5% cobbles, 11.3% gravel, 18.9% sand and 69.3% fines on the average. Volume placed was very small.

Impervious Core

Core Material	Predominantly a medium plastic lean clay with 0.2% cobbles, 5.4% gravel, 16.8% sand, and 77.6% fines on the average.
Top Width	20 feet.
Elevation at Top	5810 ft., which is 3 to 4 ft. below top of dam.
Slopes (taper)	0.1H to 1V downstream and 0.2H to 1V upstream.

Inclined (Chimney) Drain

	An 8 to 12 ft. wide Transition II sand (SP) layer and an 8 to 12 ft. wide Drainage Fill II gravel (GP) layer between the core and the downstream shell material.
Elevation at Top	5798 ft. NGVD.
Slopes	Vary slightly, but generally parallel to the downstream slope of the core.

Horizontal (Blanket) Drain

	A 1.5 to 3.0 ft. thick Drainage Fill I gravel (GP) layer, protected with a bottom layer of Transition I sand (SP) and a Transition II sand (SP, SP-SM) top layer. Placed directly on foundation under the downstream shell.
	The drain transmits seepage to the buried toe drain (12" diameter slotted PVC), and daylights to the downstream right abutment toe ditch between approximately Station 16+45 and 24+00.
Elevation at Top	5780 ft. NGVD.

Downstream Shell

Random I Material	Predominantly 89% fine grained materials, but some (11%) coarse grained materials, with 1.8% cobbles, 13.1% gravel, 20.5% sand and 64.6% fines on the average.

Riprap Face of Dam

A minimum 24 inch thick layer of processed quarry rock consisting of predominantly Nugget Sandstone imported from a quarry near Peoa.

Instrumentation

Five (5) lines of instrumentation located along Stations 13+00, 15+50, 18+00, 20+50 and 23+50. Total of 75 vibrating wire and 17 open tube piezometers, 3 observation wells, 13 inclinometer casings with settlement joints, and 41 surface survey monuments. 3 seepage measuring points and 5 accelerographs. See Table 13.

TABLE 7
SPECIFICATIONS, DISTRICT GUIDANCE, ACCEPTED VARIATIONS

MATERIAL/ITEM	SPECIFICATION [4] REQUIREMENTS	DISTRICT GUIDANCE[5]	ACCEPTED VARIATIONS
RANDOM I	(2)		
SOIL TYPE	GW, GP, GM, GC, SW, SP, SM, SC, CL, ML	--	Minor quantities of fat clay (CH), or organic rich soil. See Plate 19.
GRADATION Passing 8"	100% No other restrictions.		Infrequent oversize, up to 5% by weight in some locations.
PERCENT COMPACTION	NA[1] (Procedural Specification)	Minimum 93%. Minimum running average 99% with not more than 10% of the tests between 93% and 95%.	See Plate 20 and 21.
MOISTURE	-3% to OMC	-4% to +3% with less than 10% of the tests between +1% and +3% and less than 10% of the tests (below Elev. 5685') or 5% (above Elev. 5685') between -4% and -3% dry of OMC.	See Plate 20 and 21. Changed moisture band to -3% to +1% of OMC in '92.
LOOSE LIFT Thickness	8" Maximum	--	Changed maximum loose lift thickness to 10" in '92. Generally loose lifts were 10" to 12" thick.

MATERIAL/ITEM	SPECIFICATION REQUIREMENTS (4)	DISTRICT GUIDANCE (5)	ACCEPTED VARIATIONS
COMPACTION			
Equipment	Sheepsfoot for fine grained soils. Vibratory Roller (10T) for coarse grained soils.	--	Based on it's performance, tamping foot Caterpillar 825 was allowed for fine grained soil.
Number of Passes	6 for fine grained soil, 5 for coarse grained soil.	--	Numerous extra passes throughout construction.
Speed	Sheepsfoot - 5.0 MPH, maximum. Vibratory Roller - 1.5 MPH maximum.	--	Caterpillar 825 restricted to 4.0 MPH maximum speed. It generally operated at about 3 MPH.
RANDOM II	(2)		
SOIL TYPE	GW, GP, GM, GC and SW, SP, SM, SC if percent gravel is > 30%.	--	Minor quantities of some borderline fine grained soils. See Plate 23.
GRADATION			
% Passing 8"	100%	Below Elev. 5660' maintain minimum 30% gravel. Between Elev. 5660' and 5685' 10% of the tests/fill may contain less than 30% gravel but not less than 25%. Above Elev. 5685' maintain a minimum 25% gravel content except that a Random I type material can be placed in a limited zone between elevations 5755' and 5798'.	See Plate 23. Also: Minimal oversize placed in '90 and '91 construction. In '92 construction season about 30% of the fill had oversize stone up to 22" in maximum dimension.
% Passing 3"	80% to 100%		
% Passing #4	20% to 70%		
% Passing #200	0% to 45%		
% Gravel	30%, Minimum		

Table 7 - Page 3

MATERIAL/ITEM	SPECIFICATION [4] REQUIREMENTS	DISTRICT GUIDANCE [5]	ACCEPTED VARIATIONS
PERCENT COMPACTION	NA[1] (Procedural Specification)	Minimum 93%. Minimum 99% running average with not more than 10% of the tests between 93% and 95%.	See Plate 24 and 25.
MOISTURE	-3% to +1% of OMC	-4% to +3% with less than 10% of the tests between +1% and +3% and less than 10% of the tests (below Elev. 5685') or 5% of the tests (above Elev. 5685') between -4% and -3% of OMC.	See Plate 24 and 25.
LOOSE LIFT Thickness	12", Maximum	--	Loose lift varied from 8" to 16", but was generally 12" to 14" thick.
COMPACTION			
Equipment	Vibratory Roller (10T)	--	--
Number of Passes	5	--	Varied greatly, generally 6 to 8, sometimes 10 to 12.
Speed	1.5 MPH, Maximum	--	Enforced 1.5 MPH in '90 and '91. Allowed 2.5 to 3.0 MPH in '92.

Table 7 - Page 4

MATERIAL/ITEM	SPECIFICATION (4) REQUIREMENTS	DISTRICT GUIDANCE (5)	ACCEPTED VARIATIONS
RANDOM III	OPTION NOT EXERCISED	--	--
RANDOM IV	(2) Requirements are the same as Random I.	Rezonation of the Upstream shell to accommodate placement of a Random I type material in the RII zone between elevation 5755' and 5798'. Similar to Random I except moisture band limited to +1.5% of OMC.	Initial lifts placed at elevations varying from 5765' to 5770' depending on the fill elevation at a particular station/location. Last lifts placed about elevation 5786.5. See Plates 2 and 28.
IMPERVIOUS CORE	(2)		
SOIL TYPE	CL, ML	--	Minor quantities of fat clay (CH), almost always placed a low to medium plastic lean clay (CL). See Plate 29.
GRADATION % Passing 6"	100%	--	
% Passing #200 sieve at Abutments	70%, Minimum	--	Generally 65% to 87% passing the #200 sieve. On rare occasion minimum fines content was not met.
% Passing #200 Sieve Elsewhere	50%, Minimum	--	

Table 7 - Page 5

MATERIAL/ITEM	SPECIFICATION (4) REQUIREMENTS	DISTRICT GUIDANCE (5)	ACCEPTED VARIATIONS
PERCENT COMPACTION	NA(1) (Procedural Specifications)	Minimum 93%. Minimum running average 99% with not more than 10% of the tests between 93% and 95%.	See Plate 30 and 31.
MOISTURE			
At Abutments	-1% to +1% of OMC	-2% to +3% with less than 10% of the tests/fill between +1% and +3% and less than 10% of the tests (below Elev. 5685') or 5% of the tests (above Elev. 5685') between -2% and -1% of OMC.	See Plate 30 and 31.
Away from the Abutments	-3% to +1% of OMC	-4% to +3% with less than 10% of the tests/fill between +1% and +3% and less than 10% of the tests (below Elev. 5685') or 5% of the tests (above Elev. 5685') between -4% and -3% of OMC.	See Plates 30 and 31.
LOOSE LIFT			
Thickness	8", Maximum	--	Changed maximum loose lift thickness to 10" in '92. Generally loose lifts varied from 8" to 12" thick.

MATERIAL/ITEM	SPECIFICATION (4) REQUIREMENTS	DISTRICT GUIDANCE (5)	ACCEPTED VARIATIONS
COMPACTION			
Equipment	Sheepsfoot. Rubber tired equipment at the abutments.	--	Except for initial and abutment placements, tamping foot CAT 825 was used. Allowed based on its performance.
Number of Passes	6	--	Numerous extra passes throughout the construction.
Speed	Sheepsfoot, 5.0 MPH, Maximum. Rubber tired equipment speed not stated.	--	Maximum allowed was 4.0 MPH, but because of restricted space speed was generally 1.5 to 2.5 MPH.
TRANSITION I			
SOIL TYPE	SP	--	Almost always SP material placed. Some SP-SC material placed. See Plate 33.
GRADATION			
% Passing 1-1/2"	100%	--	--
% Passing 3/4"	90% to 100%		
% Passing #4	72% to 100%		
% Passing #200	0% to 5%		
COMPACTION	None(3)	--	Relative density determined. 50% relative density considered the minimum with average of 70%. See Plate 34.

MATERIAL/ITEM	SPECIFICATION (4) REQUIREMENTS	DISTRICT GUIDANCE (5)	ACCEPTED VARIATIONS
MOISTURE	-2% to +1% of OMC	--	See Plate 34.
LOOSE LIFT Thickness	12", Maximum	--	Varied. Generally placed in 10" to 14" loose lifts.
COMPACTION			
Equipment	Vibratory Roller (10T)	--	—
Number of Passes	2		At the abutments the three horizontal blanket drain zones, (TI, DI, TII), were rolled concurrently. Speed was generally slower than 1.5 MPH and the number of passes greater than specified because of drum overlap.
Speed	1.5 MPH, Maximum		
TRANSITION II			
SOIL TYPE	SP, SP-SM, SP-SC, SM, SC	--	None. Generally SP, SP-SC material placed that was similar to Transition I. See Plate 33.
GRADATION			
% Passing 1-1/2"	100%	--	--
% Passing 3/4"	90% to 100%		
% Passing #4	72% to 100%		
% Passing #200	0% to 15%		
COMPACTION	None(3)	--	Relative density determined. 50%

MATERIAL/ITEM	SPECIFICATION [4] REQUIREMENTS	DISTRICT GUIDANCE [5]	ACCEPTED VARIATIONS
			relative density considered the minimum with average of 70%. See Plate 34.
MOISTURE	-2% to +1% of OMC	--	See Plate 34.
LOOSE LIFT Thickness	12", Maximum	--	Varied. Generally placed in 10" to 14" loose lifts.
COMPACTION Equipment	Vibratory Roller (10T)	--	--
Number of Passes	4	--	At the abutments the three horizontal blanket drain zones, (TI, DI, TII), were rolled concurrently. Speed was generally slower than 1.5 MPH and the number of passes greater than specified because of drum overlap.
Speed	1.5 MPH, Maximum	--	
DRAINAGE FILL I			
SOIL TYPE	GP	--	Generally placed GP. Some stone was not washed clean and particles had clay or silt coatings. See Plate 35.

MATERIAL/ITEM	SPECIFICATION REQUIREMENTS (4)	DISTRICT GUIDANCE (5)	ACCEPTED VARIATIONS
GRADATION			
% Passing 1-1/2"	100%	--	
% Passing 3/4"	60% to 100%		
% Passing #4	0% to 10%		
COMPACTION	None		
MOISTURE	2 Gal/SY/Lift	--	Moisture application never checked. Water applied mostly for dust control.
LOOSE LIFT Thickness	12", Maximum	--	Varied. Generally placed in 10" to 14" loose lifts.
COMPACTION	Static Smooth Drum (10T)	--	Rolled in vibratory mode at the abutments. At the abutments the three horizontal blanket drain zones, (TI, DI, TII), were rolled concurrently. Speed was generally slower than 1.5 MPH and number of passes greater than specified because of drum overlap.
DRAINAGE FILL II			
SOIL TYPE	GP	--	None. Generally placed GP material similar to Drainage Fill I. See Plate 35.

Table 7 - Page 10

MATERIAL/ITEM	SPECIFICATION REQUIREMENTS (4)	DISTRICT GUIDANCE (5)	ACCEPTED VARIATIONS
GRADATION			
% Passing 4"	100%	--	--
% Passing 1-1/2"	65% to 100%		
% Passing 3/4"	35% to 100%		
% Passing #4	0% to 50%		
% Passing #16	0% to 5%		
COMPACTION	None	--	--
MOISTURE	2 Gal/SY/Lift	--	Moisture application never checked. Water applied mostly for dust control.
LOOSE LIFT Thickness	12", Maximum	--	Varied. Generally placed in 10" to 14" loose lifts.
COMPACTION			
Equipment	Static Smooth Drum (10T)	--	--
Number of Passes	2	--	--
Speed	1.5 MPH, Maximum	--	--

Notes
(1) Minimum 95% Compaction by Design.

MATERIAL/ITEM	SPECIFICATION [4] REQUIREMENTS	DISTRICT GUIDANCE [5]	ACCEPTED VARIATIONS

(2) Minimum on-grade processing included removal of oversize, as much disking as needed to meet moisture requirements, and a minimum 2 to 4 passes of a disk for mixing and blending.
(3) Minimum Relative Density not specified.
(4) Reference Specification Section 02212, Embankment.
(5) Refers to formal written guidance provided in response to requests from the Resident Engineer.

TABLE 8
DESIGN VERSUS AS-BUILT PROPERTIES

PROPERTY	DESIGN[1]	AS-BUILT[2]
RANDOM I		
Unit Weight (PCF)		
Dry	117	104.4 to 122.8, Ave. 113.6
Moist	129	122.6 to 138.7, Ave. 130.4
Saturated	135	--
Percent Compaction (Standard)	95%, Minimum	96.7% to 107.2%, Ave. 102.3%, Median 102.3%
Placement Moisture (With Respect to OMC)	-3.0% to OMC	-3.7% to +1.1%, Ave. -1.2%, Median -1.4%
Moisture Content (% by Dry Weight)	12% to 20%	10.6% to 18.4% Ave. 14.8%, Median 14.9%
Shear Strength		
Unconsolidated Undrained (Q)	C = 1000 psf, Ø = 17.0°	C = 2000 psf, Ø = 13.0°
Consolidated Undrained (R)	C = 1000 psf, Ø = 19.0°	C = 400 psf, Ø = 15.0°
Consolidated Drained (S)	C = 0 Ø' = 36.0°	C = 0 psf, Ø' = 34.0°
Coefficient of Permeability (K)	$1x10^{-6}$ to $1x10^{-4}$ cm/s @ 95% Compaction	--
Compression Index (Cc)	0.08 to 0.10 @ 95% Compaction	--

RANDOM II

PROPERTY	DESIGN[1]	AS-BUILT[2]
Unit Weight (PCF)		
Dry	117	116.5 to 135.2, Ave. 125.8
Moist	129	126.0 to 146.3, Ave. 136.6
Saturated	135	--
Percent Compaction (Standard)	95%, Minimum	94.7% to 105.5%, Ave, 100.0%, Median 100.0%
Placement Moisture (With Respect to OMC)	-3.0% to +1.0%	-2.4% to +1.5%, Ave. -0.5%, Median -0.5%
Moisture Content (% by Dry Weight)	6% to 13%	6.0% to 11.5% Ave. 8.7%, Median 8.5%
Shear Strength		
Unconsolidated Undrained (Q)	C = 1000 psf, Ø = 17.0°	Not Tested Not Tested
Consolidated Undrained (R)	C = 1000 psf, Ø = 19.0°	C = 1300 psf, Ø = 15.0°
Consolidated Drained (S)	C = 0 Ø = 36.0°	C = 0 Ø = 34.0°
Coefficient of Permeability (K)	1×10^{-6} to 1×10^{-4} cm/s @ 95% Compaction	--
Compression Index (Cc)	0.08 to 0.10 @ 95% Compaction	--

RANDOM III

OPTION NOT EXERCISED

Table 8 - Page 3

RANDOM IV

PROPERTY	DESIGN[1]	AS-BUILT[2]
Unit Weight (PCF)		
Dry	(3)	104.3 to 113.7, Ave. 110.2
Moist		125.0 to 132.0, Ave. 129.0
Saturated		--
Percent Compaction (Standard)	95%, Minimum	98.0% to 105.0%, Ave. 102.5%, Median 101.7%
Placement Moisture (With Respect to OMC)	-3.0% to +1.0%	-2.8% to +0.4%, Ave. -0.7%, Median -1.1%
Moisture Content (% by Dry Weight)	11% to 21%	16.8% to 20.0%, Ave. 17.2%, Median 17.0%

IMPERVIOUS CORE

PROPERTY	DESIGN[1]	AS-BUILT[2]
Unit Weight (PCF)		
Dry	105.0	100.0 to 115.7, Ave. 108.5
Moist	124.0	120.0 to 132.2, Ave. 127.6
Saturated	127.0	--
Percent Compaction (Standard)	95%, Minimum	95.2% to 106.1%, Ave. 100.7%, Median 100.5%
Placement Moisture (With Respect to OMC)	-3.0% to +1.0%	-3.0% to +2.3%, Ave. -0.3%, Median -0.3%
Moisture Content (% by Dry Weight)	16% to 20%	14.0% to 21.1%, Ave. 17.6%, Median 17.6%
Shear Strength		
Unconsolidated Undrained (Q)	C = 2350 psf, Ø = 2.5°	C = 2600 psf, Ø = 5.0°

Table 8 - Page 4

PROPERTY	**DESIGN**[1]	**AS-BUILT**[2]
Consolidated Undrained (R)	C = 800 psf, Ø = 12.0°	C = 1000 psf, Ø = 13.0°
Consolidated Drained (S)	C = 0, Ø = 26.0°	C = 0 Ø = 30.0°
Coefficient of Permeability (K)	$5x10^{-7}$ to $5x10^{-6}$ cm/s @ 95% Compaction	$8x10^{-9}$ cm/s
Compression Index (Cc)	--	0.09

Notes:

(1) Reference Design Memorandum No. 10, Little Dell Lake, Salt Lake City Streams, Utah, Embankment and Spillway.
(2) Range of values represents 90% of the test results. Lowest and highest 5% not reported in this table.
(3) Random IV zone incorporated as a change during construction. It was anticipated this zone would have properties similar to the Random I downstream shell or Impervious Core material/embankment.
(4) The Transition I and II and Drainage Fill I and II materials/zones of the Inclined (Chimney) and Horizontal (Blanket) drains were designed to meet filter criteria with respect to piping and permeability. The strength and unit weight of the Transition and Drainage Fill materials were assumed to be the same as the shell (Random) materials.
(5) Refer to Plates 19 through 35 for more information.

TABLE 9
EMBANKMENT FACTORS OF SAFETY

CONDITION ANALYZED	REQUIRED FACTOR OF SAFETY PER EM 1110-2-1902	FEATURE DM FACTOR OF SAFETY	"AS-BUILT" FACTOR OF SAFETY
END OF CONSTRUCTION	1.3	1.47	1.29
STEADY SEEPAGE	1.5	1.81	1.60
PARTIAL POOL	1.5	2.09	1.79
SUDDEN DRAWDOWN (From Spillway Crest)	1.2	1.18	1.17/1.35[(1)] Infinite Slope F. S. Above El. 5735=1.12 Below El. 5735=1.40

(1) Based on current Corps sudden drawdown analysis using the UTEXAS3 stability program. See Text.

TABLE 10
EMBANKMENT AND FOUNDATION CHANGE ORDER MODIFICATIONS

MOD. NUMBER	SPK 84 NUMBER	DESCRIPTION	COMMENTS	AMOUNT (IN DOLLARS)
P00029	VP040	01/25/91 **Cofferdam Instrumentation.** Nine temporary observation wells were installed in the Upstream cofferdam section.	HQUSACE and CESPD Geotechnical personnel recommended instrumenting the cofferdam. Instrumentation considered necessary in the event of reservoir filling.	45,000
P00036	VP048	05/14/91 **Piezometer Low Air Entry filters.** Available high air entry porous tips and vibrating wire tip filters were replaced with low air entry tips and filters. Four VW piezometers added.	Project personnel recommended the change to assure long term performance and enhance responsiveness.	7,400
P00038	VP054	06/19/91 **Remove Deteriorated Impervious Core.** Impervious core material deteriorated due to exposure over the winter.	Contractor failed to adequately protect the embankment. Deterioration was the result of freeze-thaw and wetting-drying. Project Geotechnical Engineer recommended remedial action.	3,630
P00040	VP057I	07/22/91 **Additional Dental Treatment.** Perform dental treatment (mortaring & concrete) as directed on those beds in the core trench in excess of the expected dental treatment of scattered, narrow zones of harder rock. Perform preliminary foundation cleanup and dental treatment of portions of the upstream core trench slope.	Contractor alleged changed conditions requiring dental treatment in more areas than indicated in the Plans and Specifications. CESPK-ED-G recommended dental treatment of the most open fractures on the Upstream core trench cut slope.	100,000

MOD. NUMBER	SPK 84 NUMBER	DESCRIPTION	COMMENTS	AMOUNT (IN DOLLARS)
P00042	VP051I	08/08/91 **Reduce Chimney Drain Width.** Transition II and Drainage Fill II widths were changed from 12 ft. each to 8 ft.	Change initiated by VEP from Project Personnel. Actual placed widths were 9 ft. to 11 ft. because Contractor did not control placement to 8 ft. wide zones.	<74,520>
P00050	VP061	10/21/91 **No Air Drilling Instrumentation.** The Contractor was prohibited from using air to drill or clean out instrumentation holes. OW-2 tip elevation lowered. Instrument mound soil testing frequency reduced.	Air drilling was eliminated to guard against damaging the embankment and foundation. OW-2 was extended to fit field conditions.	22,600
P00059	VP070	05/28/92 **Additional Instrumentation Trench.** Two short trenches were excavated at separate locations in the core to allow installation of direct burial VW piezometers.	Two vibrating wire direct burial transducers were installed in an attempt to better monitor pore pressure in the impervious core. One VW-76 at 13+00 and one VW-77 at 20+50.	3,500
P00062	VP073	07/09/92 **Spillway Turnaround Embankment.** The portion of the spillway turnaround fill contiguous with the dam and likely to be submerged was changed to Random II.	Contract was ambiguous. Project Geotechnical Engineer recommended use of Random II type material for stability.	39,060
P00064	VP075	07/30/92 **Add Observation Well OW-3.** Existing exploratory hole 1F-78 was recovered and extended through the embankment as an observation well. Cable trenching included. Two permanent embankment survey monuments were added.	Project personnel recommended OW-3 to help monitor seepage through the left abutment and the survey monuments to monitor the embankment above the old landslide under the D/S shell right abutment.	23,000

Table 10 - page 3

MOD. NUMBER	SPK 84 NUMBER	DESCRIPTION	COMMENTS	AMOUNT (IN DOLLARS)
P00066	VP074	08/28/92 **Instrumentation Footpath.** Revised footpath locations. Revised footpath design. Added installation of two cables to accelerographs. Revised accelerograph installations.	Contract was incomplete with respect to actual details of the footpaths. Changes to accelerographs considered a significant improvement.	33,600
P00069	VP081	09/02/92 **Rezone Upstream Embankment, Random IV.** A portion of the Upstream shell was rezoned to allow substitution of Random I-type materials.	Government and Contractor acknowledge and agree that rezonation is in the interests of achieving project completion in the 1992 construction season.	-0-
P00071	VP080	09/25/92 **Upstream Instrumentation Footpath.** Deleted and added footpaths. Required access road from the Top of Dam Road to the Upstream instrument path. Changed staff gage design.	Instrumentation access improved. Staff gages embedded two more feet to counter potential for freeze-thaw damage to footings.	7,700
P00075	VP085	10/27/92 **Accelerograph Pads.** Provides for the construction of three accelerograph pads and associated cable connection and trenching.	Change in accelerograph design necessitated contract changes.	8,095

Notes:

(1) The complete Log of Project Modifications (Mod. Log) is included as Appendix III.

TABLE 11

EQUIPMENT USED TO PROCESS, TRANSPORT AND PLACE FILL

Description	Comments
I PROCESSING EQUIPMENT	
ROCK PLANT	
Cedar Rapids Jaw Crusher, 7AC-3648-V6F with 36" to 48" jaw, vibrating grizzly and 52"x20' feeder bin.	Used to process Random II, bedding, some riprap, and preprocess Transition and Drainfill.
Eljay Fine and Coarse Cone Crushers, 1274 with 54" roller cones and 6'x16' screen decks.	Crushed offsite and onsite source materials into Transition and Drainfill.
Eljay Iron Works 54"X34' Double Screw Washer.	Washed Transition sands.
Eljay LF 5'X16' TD Wash Deck	Washed Drainage fill gravel.
Three Radial Stacking Conveyors	Rock plant rated at 500 tons/hour but never performed to this level.
Associated auxiliary Conveyors and loading hoppers/bins	
BORROW AREA	
One 60" Kolman belt loader w/vibrating grizzly. One 60" Kolman belt loader w/vibrating grizzly. One 60" KoCal belt loader w/vibrating grizzly.	Kolmans and KoCal fed by dozers and trackhoes. Material for processing was stockpiled using end dumps and scrapers. Material hauled to the embankment in rear dumps and scrapers.
Dozers: Caterpillar D10N with rippers	Ripped materials to facilitate scraper loading and drying. Push loaded scrapers. Pushed materials to belt loaders.
Caterpillar D9 L/N	Push loaded scrapers. Pushed materials to belt loaders.
Caterpillar D8 N/K	Push Loaded scrapers. Pushed materials to belt loaders.

Description	**Comments**
Excavators: Caterpillar 245 ME, Caterpillar 245B ME	Excavated vertical bank. Used to selectively borrow. Loaded rear dumps (Caterpillar 769 and 773).
Trackhoes: Caterpillar 235C, Caterpillar 225DLC, Caterpillar 225CLC, DAEW00 DH280, Hitachi EX400LC	Excavated borrow materials. Used to selectively borrow, moisture condition and load scrapers or rear dumps. Maintained stockpiles and fed belt loader hoppers.
Loaders: (Rubber Tired) Caterpillar 988B, Caterpillar 992C	Most often utilized at the rock plant. Loaded rear dumps for haul to stockpiles or embankment. Attempted to use to excavate vertical cut in borrow area.
EMBANKMENT	
Dozers: Caterpillar D8N/K/L, Caterpillar D6H, Caterpillar D4H, Caterpillar D7H	Spread material in lifts after trucks or scrapers dropped their loads. Pulled disks to mix, blend and moisture condition. Caterpillar D4 used extensively on Inclined (Chimney) Drain.
Graders: Caterpillar 14G, Caterpillar 140G, Caterpillar 16G	Occasionally used to spread lifts. Ripped Random II and trafficked areas prior to disking. Assisted mixing and blending and oversize removal in Upstream shell. Generally used to maintain haul roads on and off the embankment.
Disk Harrows: Rome 16X36 TRCH Series, Remco 16X36 MCH Series	Primarily used to mix, blend and aerate materials. Model worked well in Random I and Impervious but had difficulty attaining full depth mixing in Random II. Worked better with 42" diameter disks. Pulled by D6 or D8.
Water Truck: Caterpillar 769C 8M, Caterpillar 621E 8M, Mack Tandem 4M, KW Tandem	Caterpillar water trucks primarily used on the embankment. All trucks used on haul roads dust control.

Description	Comments
Rock Rakes: Caterpillar 960D, Caterpillar 955B, Caterpillar 426	Equipment with attached front end scalping buckets used to remove oversize in the Random I and II.
Backhoes: Caterpillar 416, Caterpillar 426	Extensively utilized in the preparation of the impervious core at the abutments and instrument mounds.
II HAULING EQUIPMENT	
BORROW & EMBANKMENT Caterpillar 631 Scrapers	Primarily utilized to haul Impervious core and Random I to the embankment. Push loaded with D9 and D10. Also used to haul to the Kolman and KoCal stockpiles and place Random II.
Caterpillar 769C and Caterpillar 773B Rear Dumps	Primarily utilized to handle Random II materials during borrow area operations and embankment placement. Occasionally hauled Random I. Caterpillar 769's also used to haul and place Inclined (Chimney) drain materials.
Mack Tandems	Extensively used to haul and place Transition and Drainage Fill materials.
Euclid R25 Rear Dumps	Miscellaneous hauling in borrow area and to embankment. Placed TII and DFII.
III COMPACTION EQUIPMENT	
Caterpillar 825C	Dedicated to rolling Random I and Impervious Core materials.
Ingersol Rand SPF60 (Pad foot)	Primarily used on Random II. Occasionally used on coarse Random I or Impervious Core.
Ingersol Rand SD150F (Pad foot)	Utilized early on Random II. Later occasionally supplemented SPF60's on the Random II.

Description	Comments
Ingersol Rand SD150D (Smooth Drum)	Utilized early on Random II. Later dedicated to Inclined and Horizontal drain compaction. Occasionally supplemented SPF60's on the Random II.
Rubber Tired Loaders: Caterpillar 950B, Caterpillar 980C, TCM 870	Dedicated to Impervious core compaction against the abutments and initial bottom placements.
Whackers and Small Vibratory Plates	Used for the compaction of fill against the abutments, for instrument mounds, and trench backfills.
IV AUXILIARY EQUIPMENT	
Trackhoes: Caterpillar 235C, Caterpillar 225 DLC, DAEW00 DH280, Caterpillar 225 CLC, Hitachi EX 400 LC	Used extensively for final foundation excavation and clean-up and riprap and bedding placement.
Rubber Tired Loaders: Caterpillar 950B, TCM 850 & 870	Placed Horizontal Blanket Drain materials (TI, DFI, TII).
Track Loaders: Komatsu D75S, Caterpillar 963 & 973	Hauled and placed riprap and bedding.
Generator Water Tank Air Compressors Ingersol Rand 350 Drill Sand Blaster Pumps Light Plants	

Notes: (1) Refer to Appendix IV, Contractor's Active Equipment List, August. This list will provide an idea of the equipment needed to achieve the higher production rates attained at this site.

TABLE 12

RECORD SAMPLING AND TESTING SUMMARY

SAMPLING DATE	RANDOM I	RANDOM II	IMPERVIOUS CORE
5-7 June 1990	None	R-bar, MA, AL, Gs	None
8-9 Sept 1990	None	R-bar, MA, AL, Gs	None
10-13 Aug 1991	R-bar, MA, AL, Gs	--	Q, R-bar, MA, AL,
30 Oct - 3 Nov 1991	Q, MA, AL, Gs	R-bar, MA, AL, Gs	Q, R-bar, MA, AL, Consol., k
26 June 1992 (bulk)	R-bar, Comp, MA, AL, Gs	R-bar, Comp, MA, AL, Gs	--

R-bar - Consolidated-undrained triaxial shear test with pore pressure readings.

MA - Mechanical Analysis Test.

Consol. - Consolidation Test.

Gs - Specific Gravity Test.

Q - Unconsolidated-undrained triaxial shear test.

AL - Atterberg limits test.

Comp. - Compaction test.

k - Permeability Test.

TABLE 13

[1]SUMMARY OF GEOTECHNICAL INSTRUMENTATION
AT END OF CONSTRUCTION

Instrument Type	Contract		Additional		Losses		Remaining Total [4]
	Foundation	Embankment	Foundation	Embankment	Foundation	Embankment	
Vibrating Wire Piezometers	31	40	4	2	2[2]	0	75
Open Tube Piezometers	15	6	7[3]	2[3]	4	0	17
Observation Wells	1	1	1	0	0	0	3
Survey Monuments	39		2		0		41
Inclinometers	13		0		0		13
Seepage Measuring Points	2		1		0		3
Accelerograph Installations	5		0		0		5

(1) Table taken from the End of Construction Report on Project Instrumentation by John Roadifer.

(2) VW-41, 42 are apparently being mechanically deformed based on data collected from them.

(3) These open tube piezometers were installed in the cofferdam for temporary monitoring during the 1990-91 winter shutdown and 1991 spring runoff. They were abandoned and grouted at closure.

(4) Subsequent to the End-of Construction, lightning destroyed eight (8) and damaged twenty-three (23) vibrating wire piezometers. Plate 42 shows which vibrating wire piezometers (VWP) were destroyed or damaged.

TABLE 14

SUMMARY OF EMBANKMENT PIEZOMETER RESPONSE DURING CONSTRUCTION

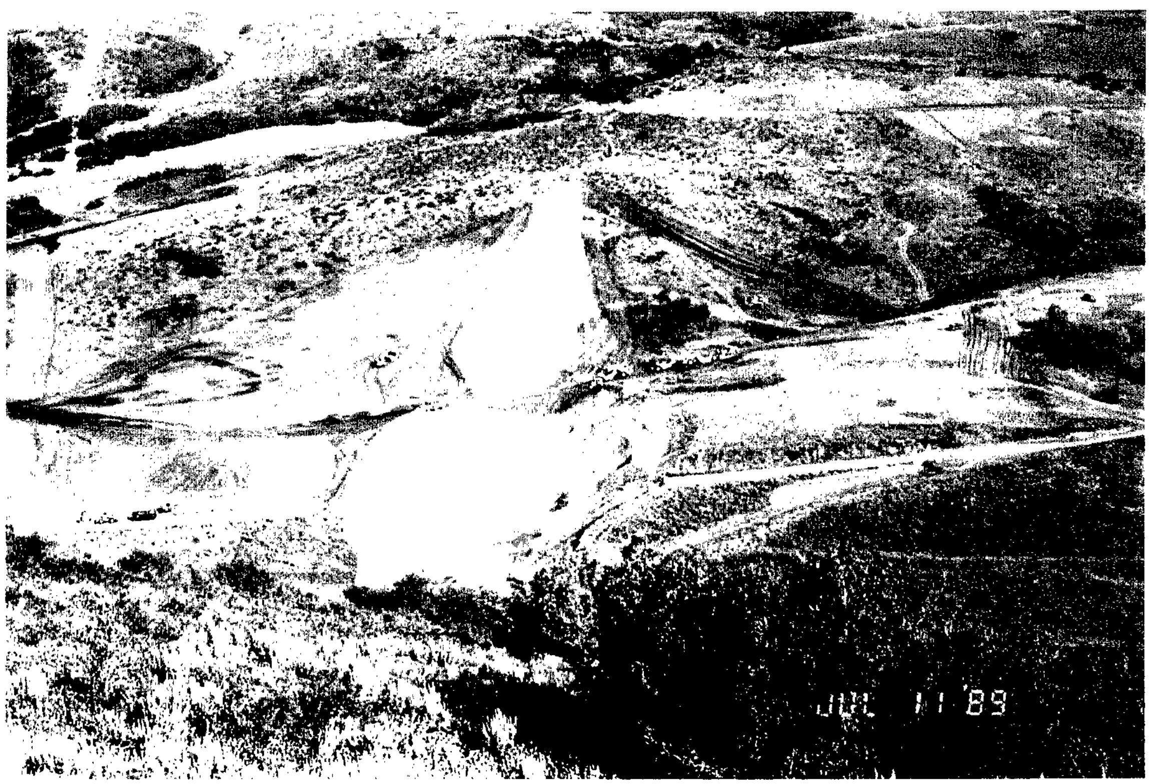
Zone	Instrument	Location	Saturated	Excess Pore Pressure	Remarks
Upstream Shell	VW-01, 02	13+00, 100 U/S	Yes	No	
	VW-12, 13	15+50, 100 U/S	No	No	
	VW-14, 15	15+50, 100 U/S	Yes	No	Saturated in Late October 1992 and began to measure piezometric surface in upstream shell.
	VW-29, 30	18+00, 100 U/S	Yes	**Yes, ≈ 4'**	Began decreasing 10-04-92
	VW-45, 46	20+50, 100 U/S	Yes	No	
	VW-61, 62	23+50, 100 U/S	Yes	**Yes, ≈ 34'**	Began decreasing 12-01-92. There are installation problems.
Downstream Shell	VW-24, 25	15+50, 65 D/S	Yes	**Yes, ≈ 13'**	Still increasing 01-01-93
	C-01	13+00, 205 D/S	No	No	
	C-04	15+50, 305 D/S	No	No	
	C-06	15+50, 600 D/S	No	No	
	C-08	18+00, 305 D/S	No	No	
	C-13	20+50, 305 D/S	No	No	
	C-18	23+50, 100 D/S	No	No	
Impervious Core	VW-05, 06	13+00, 5 D/S	No	No	
	VW-76	13+10, 5 D/S			
	VW-07, 08	13+00, 5 D/S	Yes	**Yes, ≈ 30'**	Began decreasing 11-01-92. This pair is within 5' of foundation.
	VW-18, 19	15+50, 5 D/S	No	No	
	VW-20, 21	15+50, 5 D/S	Yes	**Yes, ≈ 5'**	Began decreasing 10-04-92
	VW-31, 32	18+0-0, 100 U/S	Yes	**Yes, ≈ 60'**	Leveled off 12-01-92. This pair is associated with a spring at 17+50, upstream core trench wall.
	VW-35, 36	18+00, 5 D/S	No	No	
	VW-37, 38	18+00, 5 D/S	Yes	**Yes, ≈ 26'**	Leveled off 12-01-92. This pair may be related to VW-31, 32.
	VW-39, 40	18+00, 5 D/S	Yes	**Yes, ≈ 1-2'**	Began decreasing 09-21-92.
	VW-51, 52	20+50, 5 D/S	Yes	No	
	VW-53, 54	20+50, 5 D/S	Yes	No	
	VW-77	20+55, 5 D/S			
	VW-55, 56	20+50, 5 D/S	Yes	**Yes, ≈ 4-5'**	Leveled off 10-20-92.
	VW-65, 66	23+50, 5 D/S	No	No	
	VW-67,68	23+50, 5 D/S	Yes	**Yes, ≈ 110'**	Began decreasing 10-04-92. Installation problem.

Table taken from the End of Construction Report on Project Instrumentation by John Roadifer.

PHOTOGRAPHS

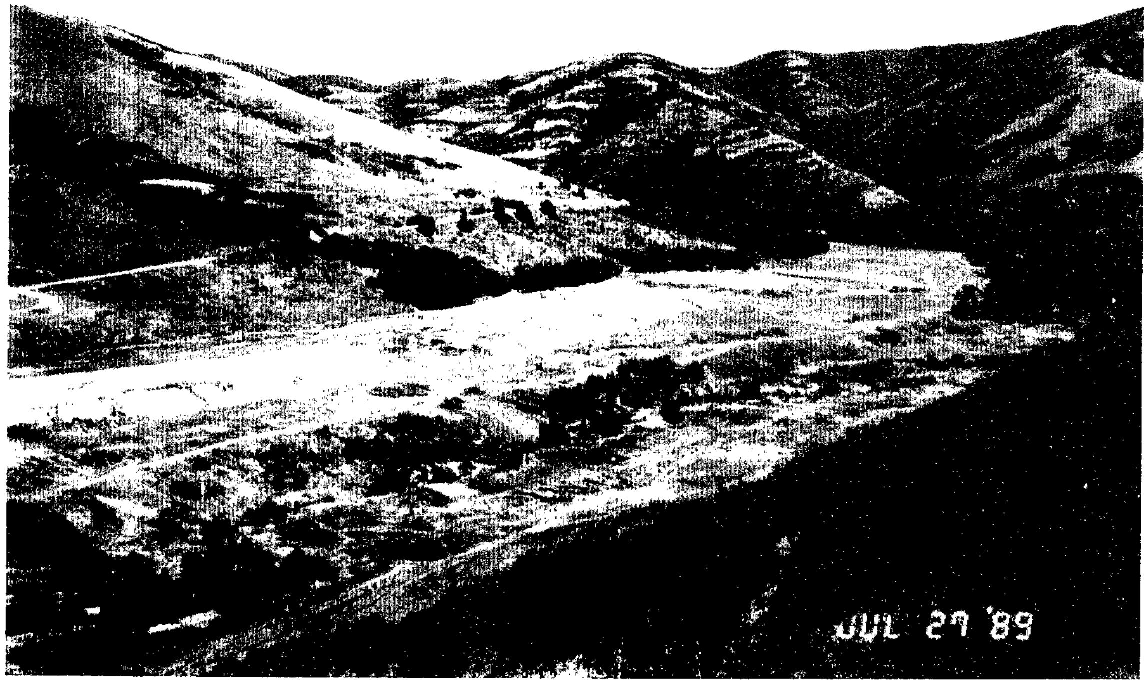
No. 1 - JULY 11, 1989.

Left Abutment and Core Trench from the Top of the Right Abutment.



NO. 2 - JULY 11, 1989.

Right Abutment and Core Trench from the Top of the Left Abutment. Foundation Stripping in Progress.

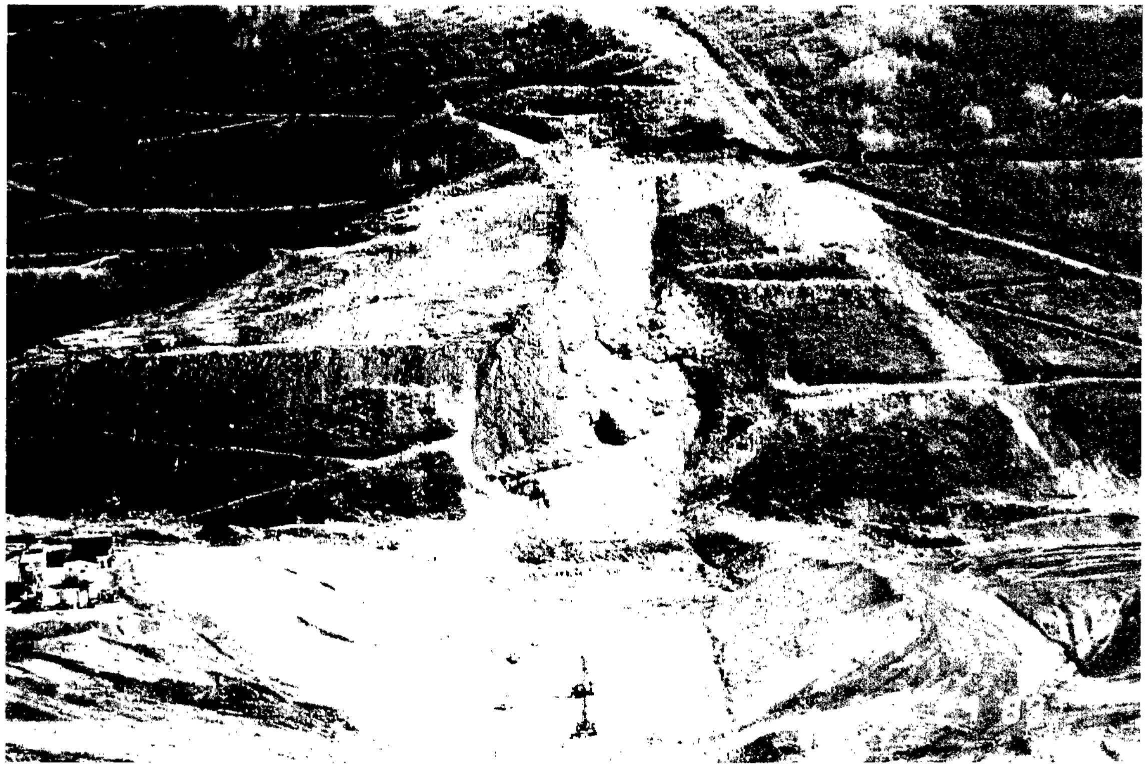


NO. 3 - JULY 27, 1989.

Reservoir Borrow Area from the Left Abutment. Clearing in Progress.

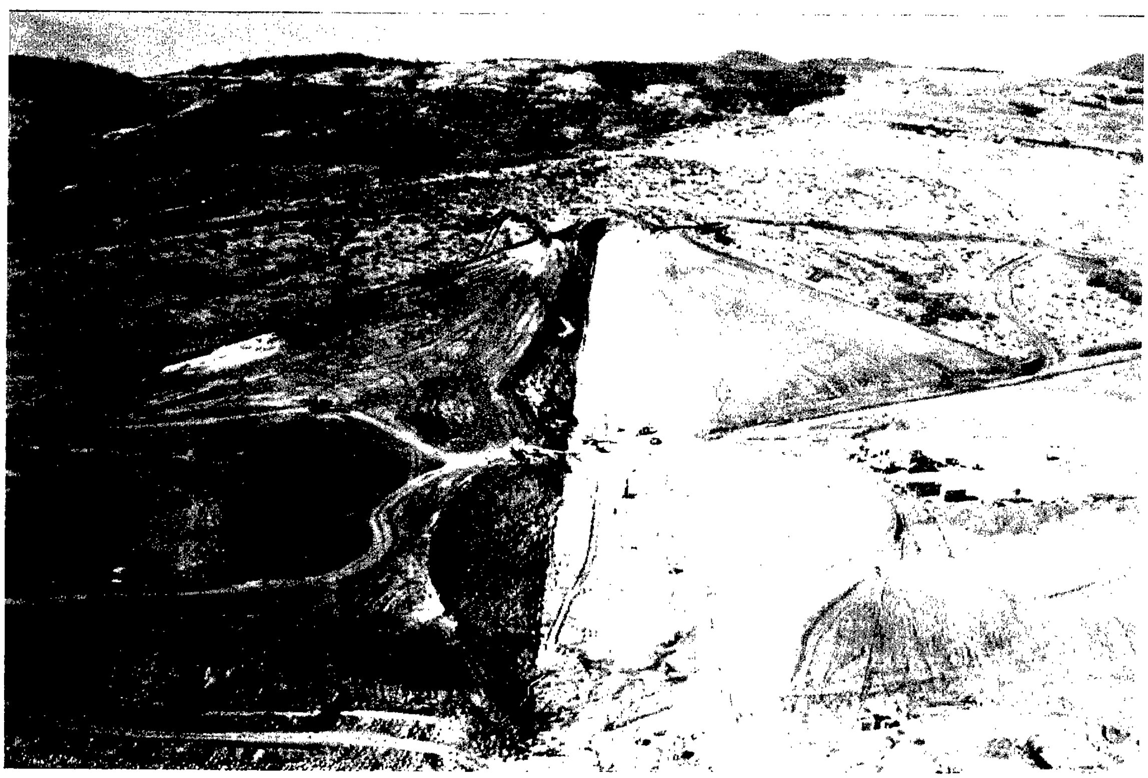
NO. 4 - SEPTEMBER 13, 1989.

Preliminary Clean-up of the Core Trench Invert. First Section Cleaned in Advance of Grouting.



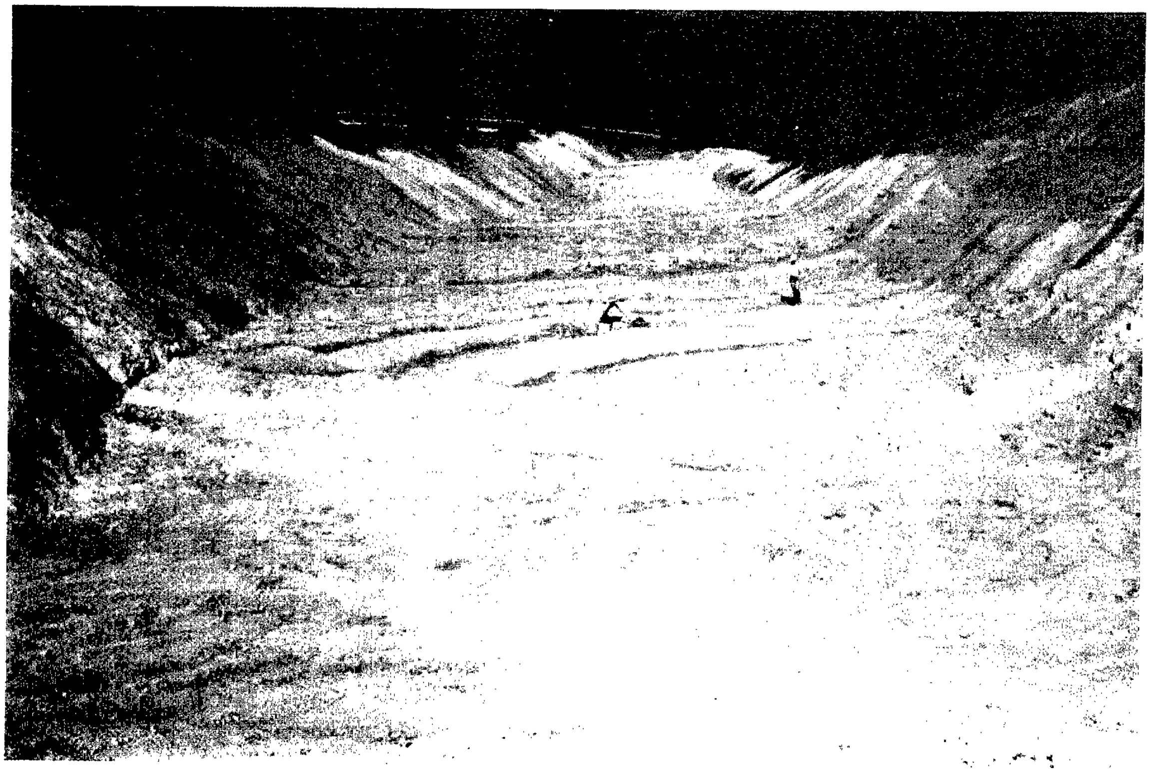
NO. 5 - SEPTEMBER 24, 1989.

Left Abutment from the Right Abutment. Foundation Excavation, Stripping and Core Trench Grouting in Progress.



NO. 6 - OCTOBER 23, 1989.

Right Abutment from the Left Abutment. Preliminary Clean-up of the Station 22 Fault in Progress.



NO. 7 - OCTOBER 25, 1989.

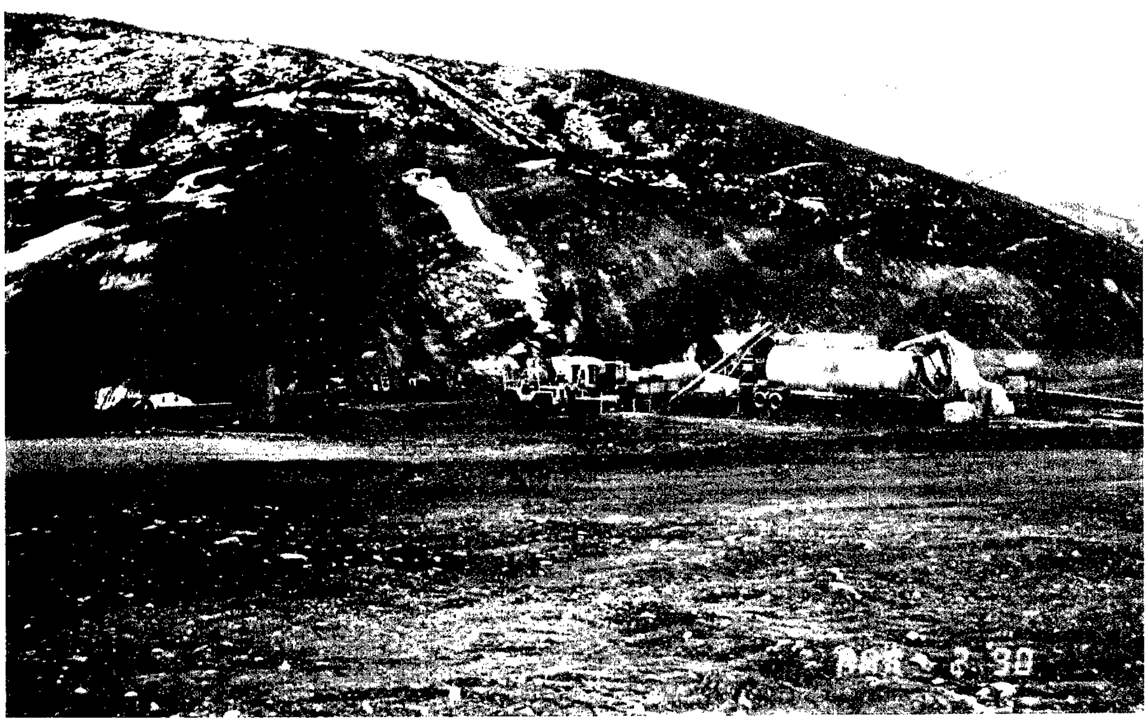
Mapping of the Station 22 Fault.

NO. 8 - OCTOBER 27, 1989.

Left Abutment from the Top of the Right Abutment. Excavation of the Core Trench and Downstream Abutment in Progress.

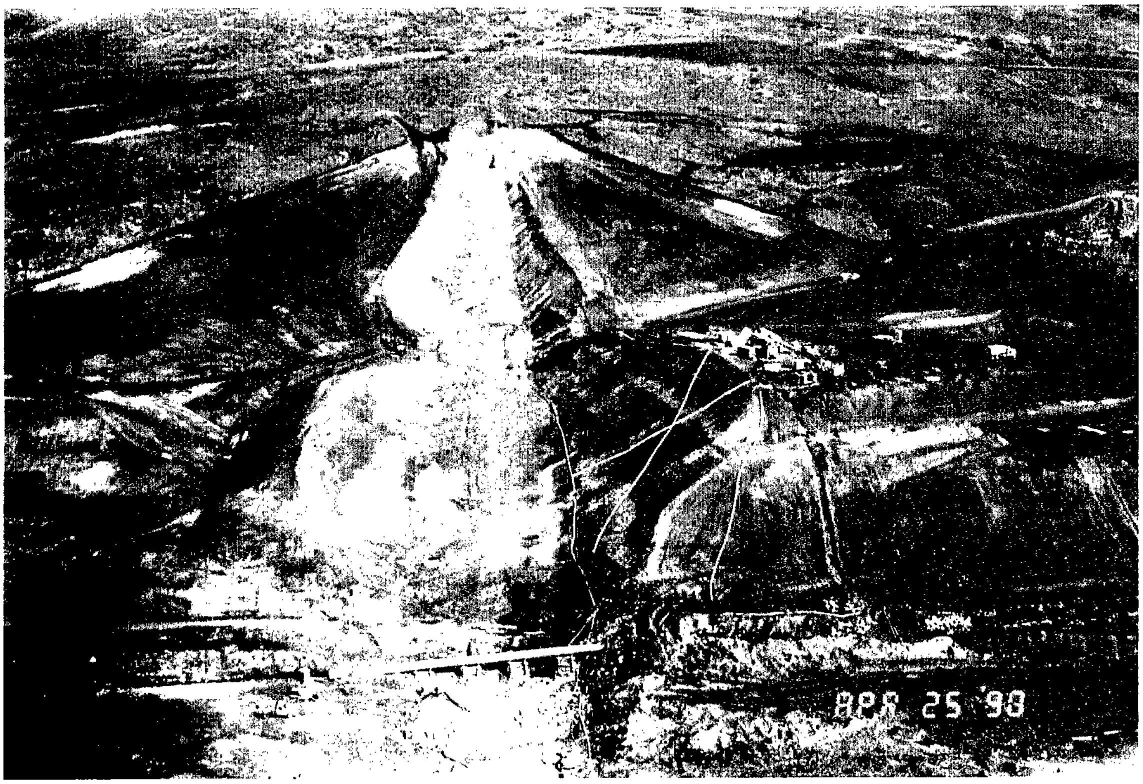
NO. 9 - MARCH 2, 1990.

Drilling and Grouting on the Right Abutment Core Trench.



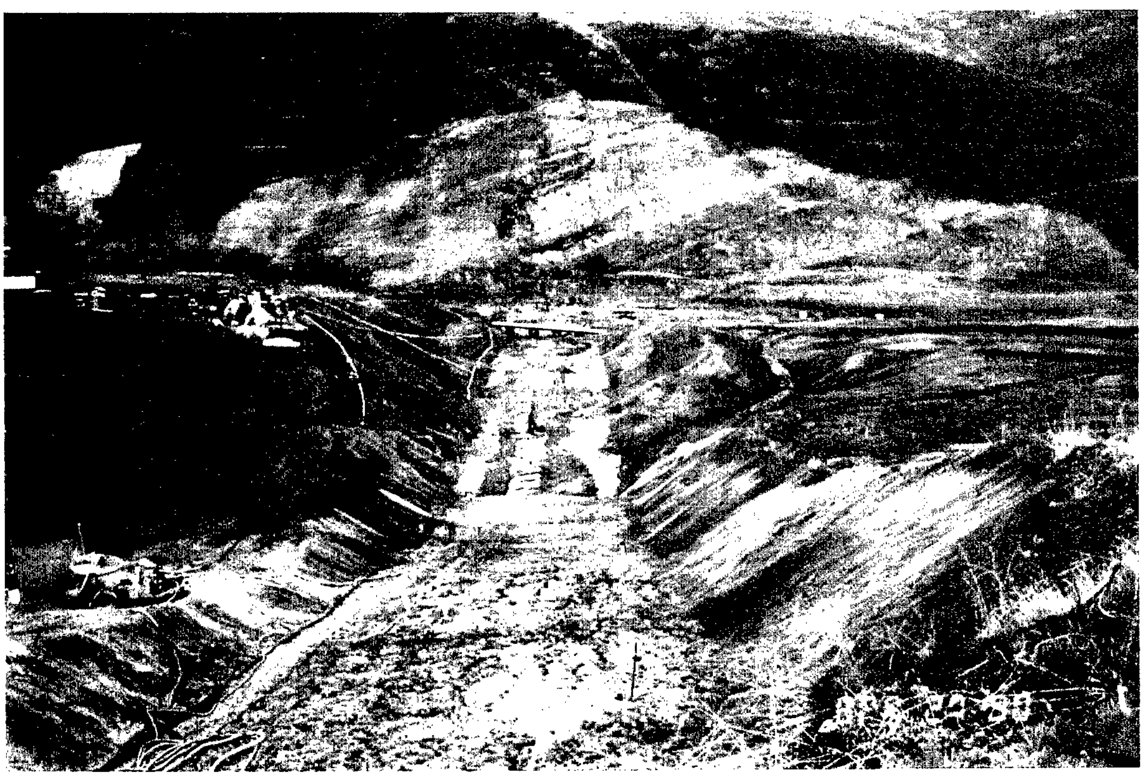
NO. 10 - MARCH 2, 1990.

Batch Plant for Foundation Grouting.



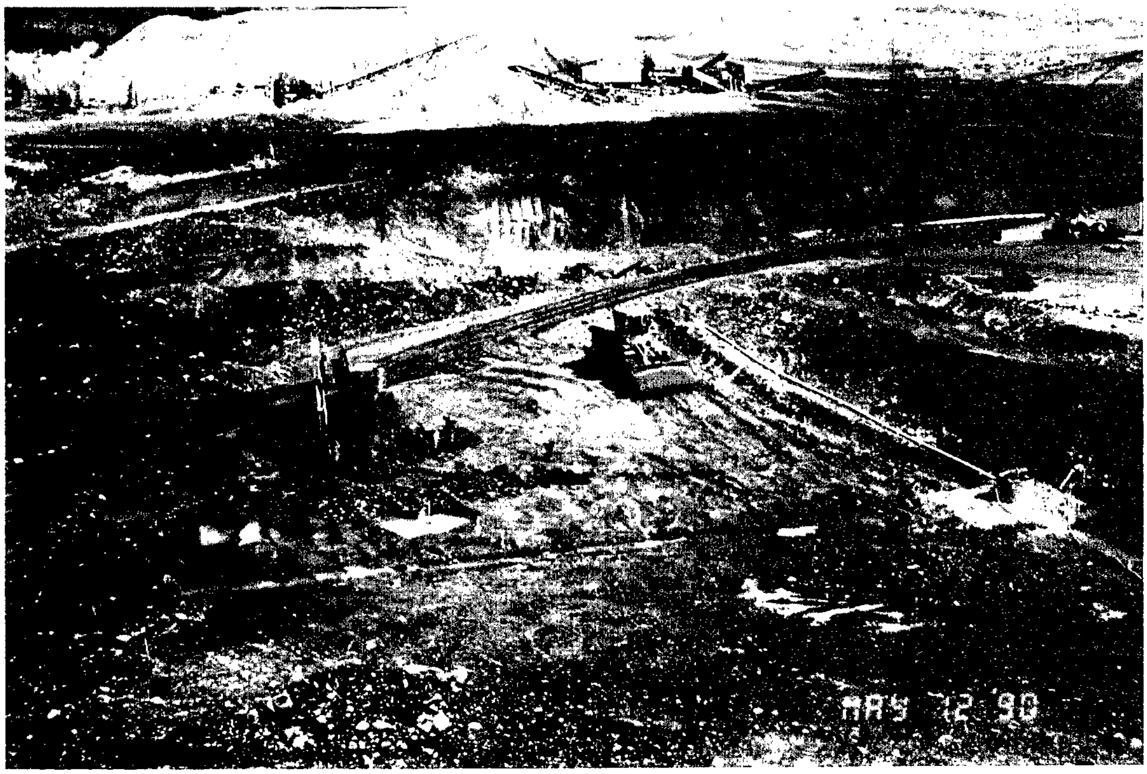
<u>NO. 11 - APRIL 25, 1990</u>.

Right Abutment from the Top of the Left Abutment. Grouting in Progress. Note the Batch Plant Location. Dell Creek "diverted" across the Core Trench in a CMP Flume.



<u>NO. 12 - APRIL 27, 1990</u>.

Left Abutment from the Top of the Right Abutment. Note the Geology Exposed on the Abutment.



NO. 13 - MAY 12, 1990.

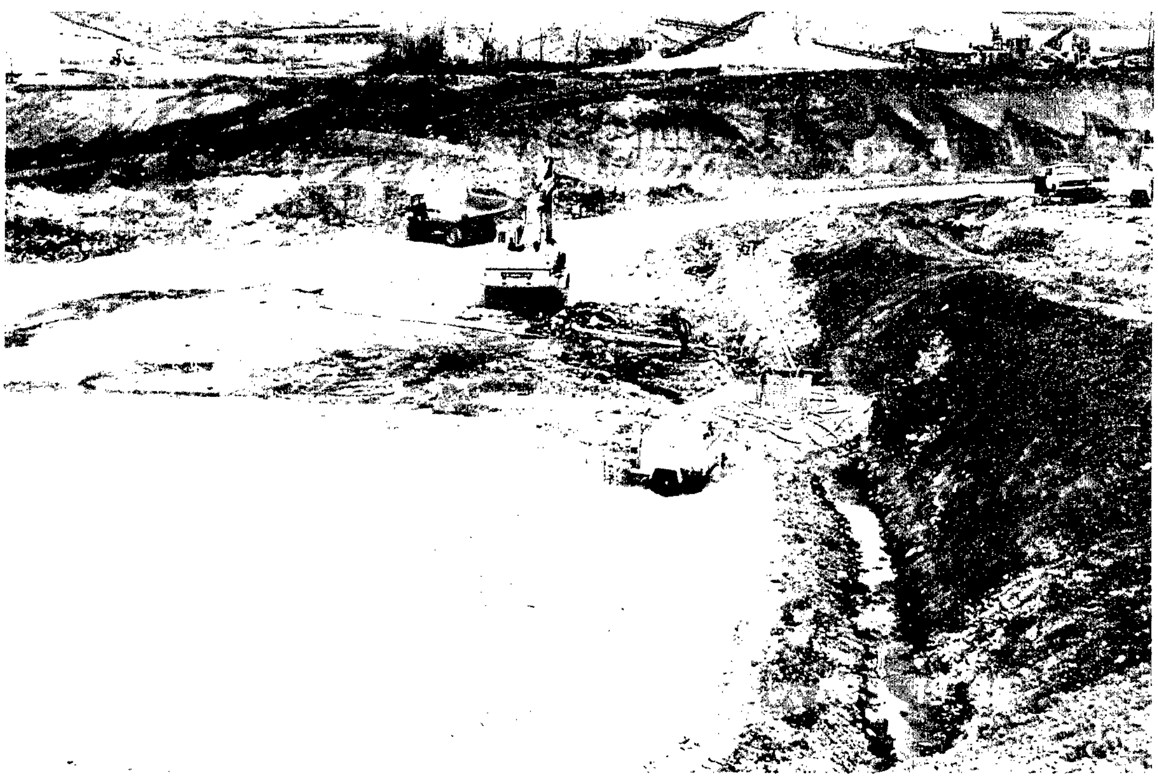
Final Excavation and Sump Installation in the Upstream Streambed Area.

NO. 14 - MAY 17, 1990.

Proof-rolling the Upstream Streambed Foundation with an Ingersol Rand SD150D Compactor.

NO. 15 - MAY 19, 1990.

Upstream Streambed Foundation After Proof-rolling, Just Prior to Embankment Placement. (Looking D/S from the U/S Toe)

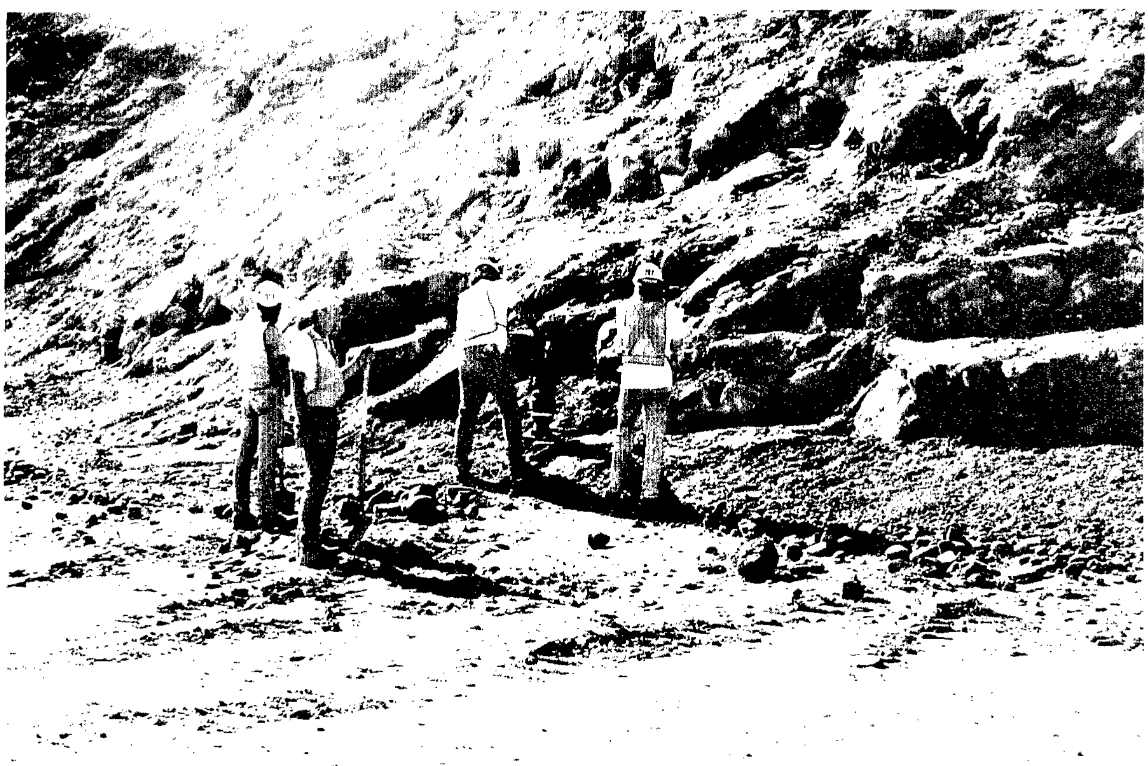


NO. 16 - MAY 19, 1990.

Gravel and CMP Sumps for Upstream Foundation Dewatering. Large Sump is at the Upstream Toe. (Looking from Left Abutment toward the Right Abutment)

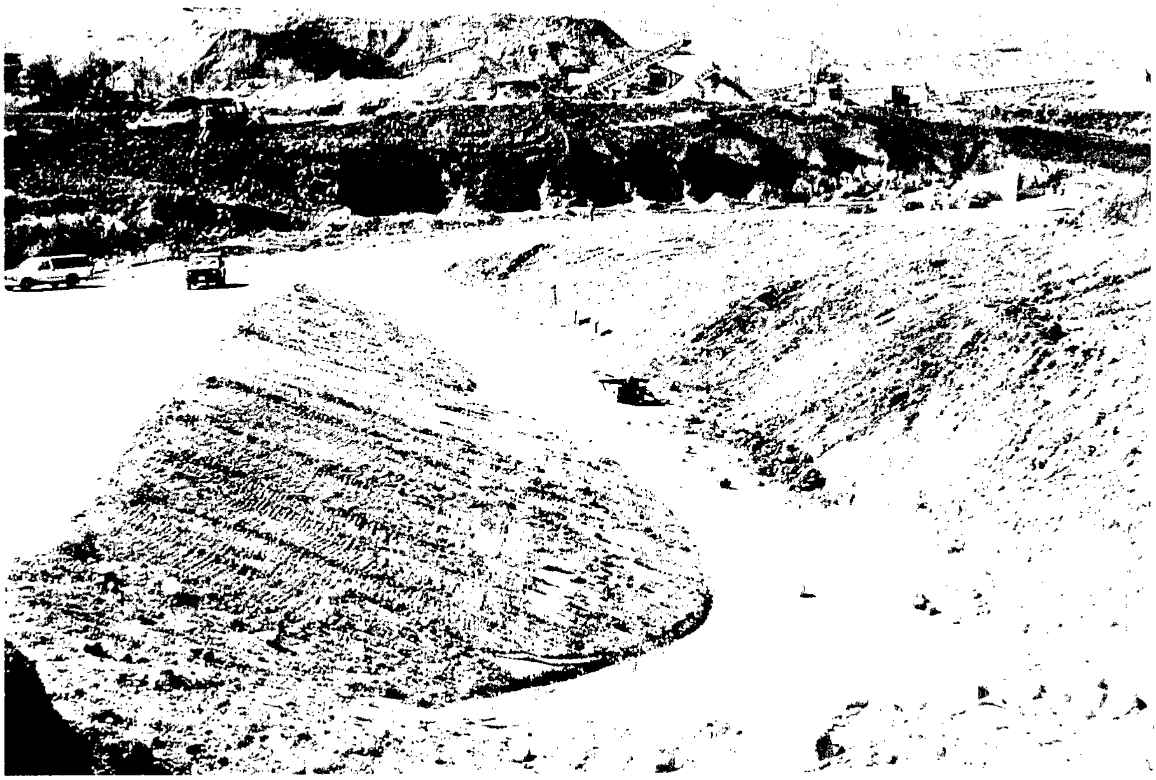
NO. 17 - MAY 22, 1990.

Initial Random II Placement in Low Areas of the Upstream Foundation. (Looking Downstream from the Upstream Toe)



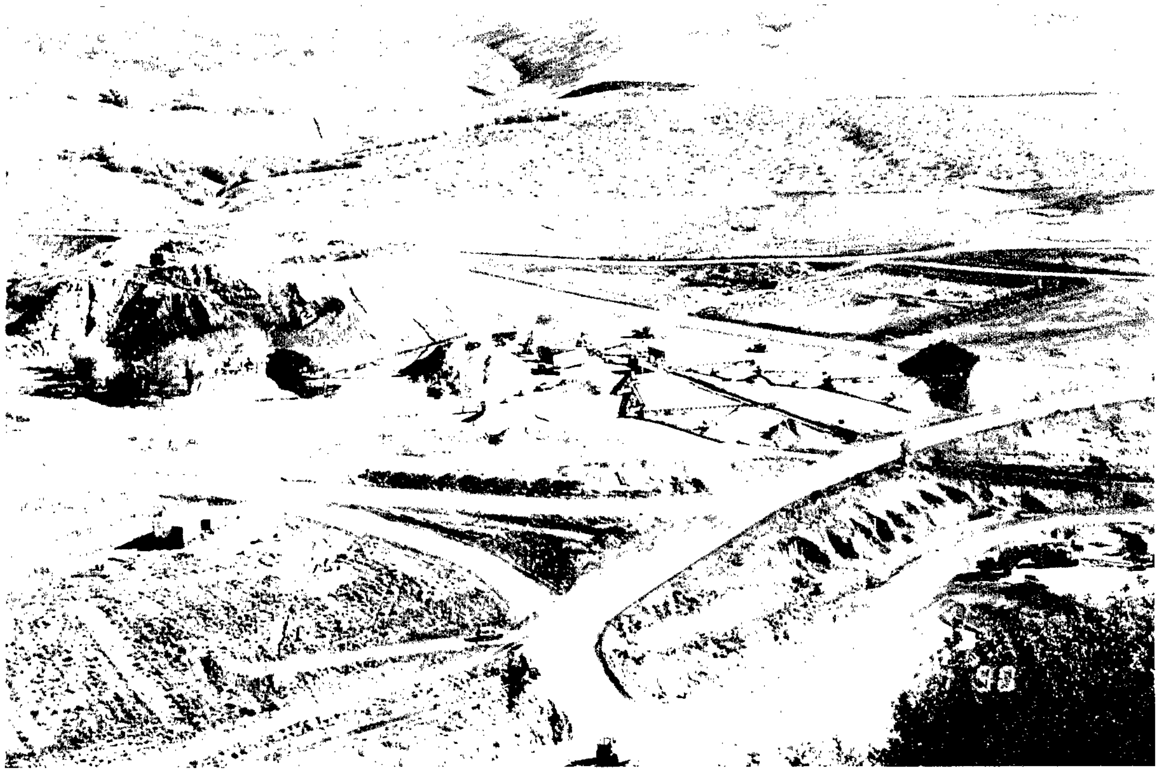
NO. 18 - JUNE 7, 1990.

Work along the Upstream Left Abutment, Random II Zone. Large Stones were Removed from the Abutment Contact. Areas Inaccessible to the Roller were Hand Compacted.



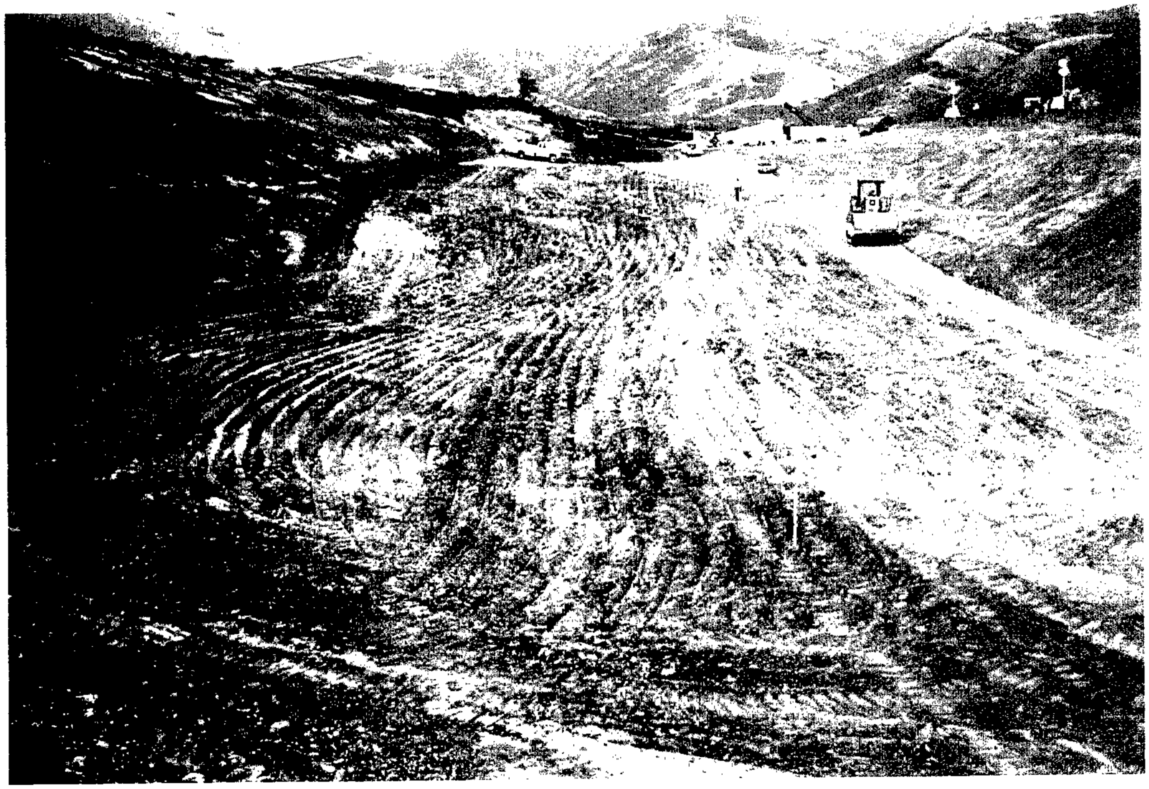
<u>NO. 19 - JUNE 20, 1990</u>.

Upstream Toe of Dam Dewatering Sump and Gravel Filled Collector Ditches. (Looking from the Left Abutment Across to the Right Abutment)



<u>NO. 20 - JUNE 21, 1990</u>.

Original Rock Plant Layout. Plant Located just Upstream of the Dam in the No Borrow Zone. Plant had 1 Jaw Crusher, 2 Cone Crushers, a Wash Deck and a Sand Screw.

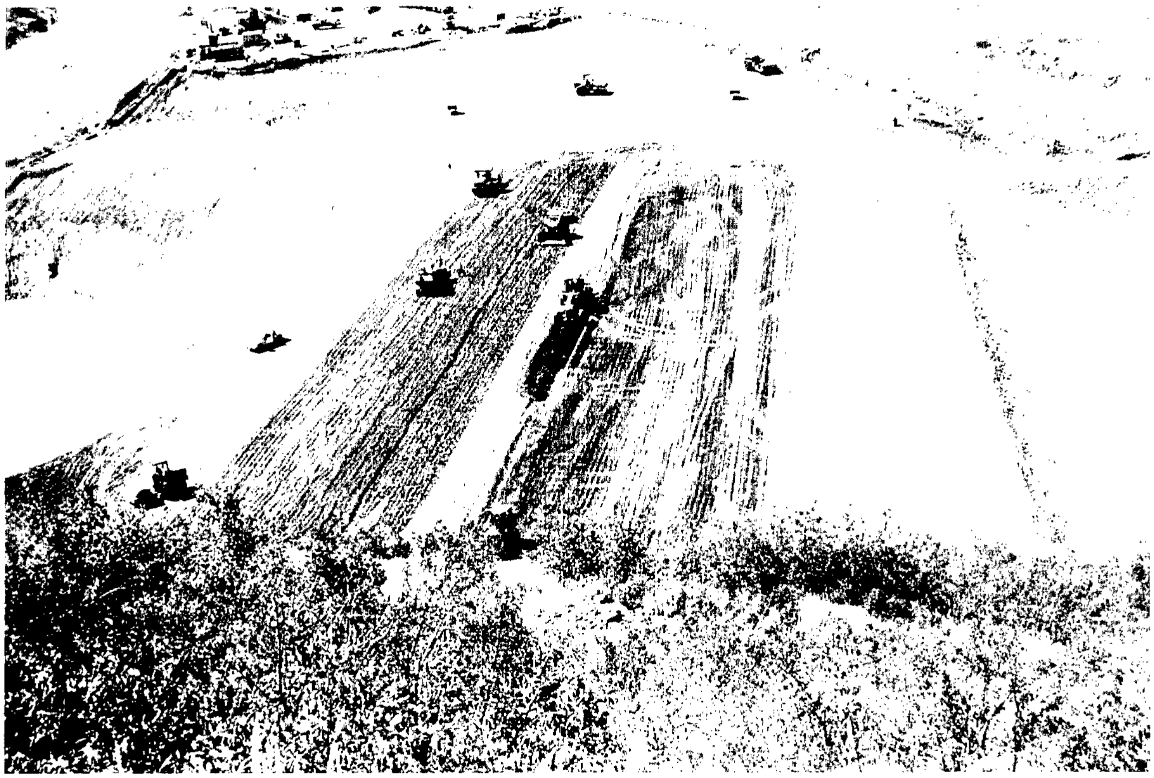


NO. 21 - JULY 14, 1990.

Proofrolling of the Right Half of the Upstream Streambed Foundation After Dell Creek was Diverted by "Pumping Around" on the Right Abutment. (Looking Upstream, Flood Control Intake in the Background)

NO. 22 - JULY 16, 1990.

Embankment Processing in the Right Half of the Upstream Streambed Area. Start of "Closure" within the Valley that Resulted in the "Cofferdam". (Looking Downstream from near the Toe)



<u>NO. 23 - AUGUST 3, 1990.</u>

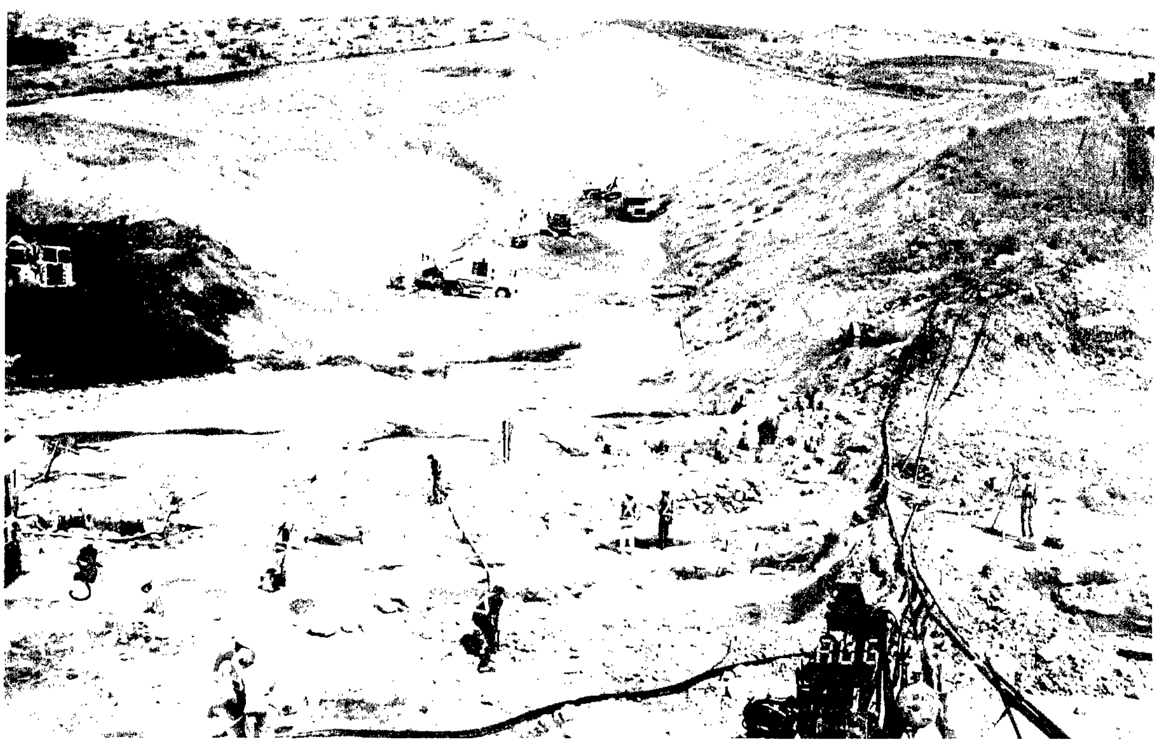
Random II, "Cofferdam", Operations. Spreading with the Motor Grader after a Scraper Dumped a Load Followed by Disking, Rock Picking and Compaction with an IR SD150D and an IR SPF60. (Looking Right from the Left Abutment)

<u>NO. 24 - AUGUST 13, 1990.</u>

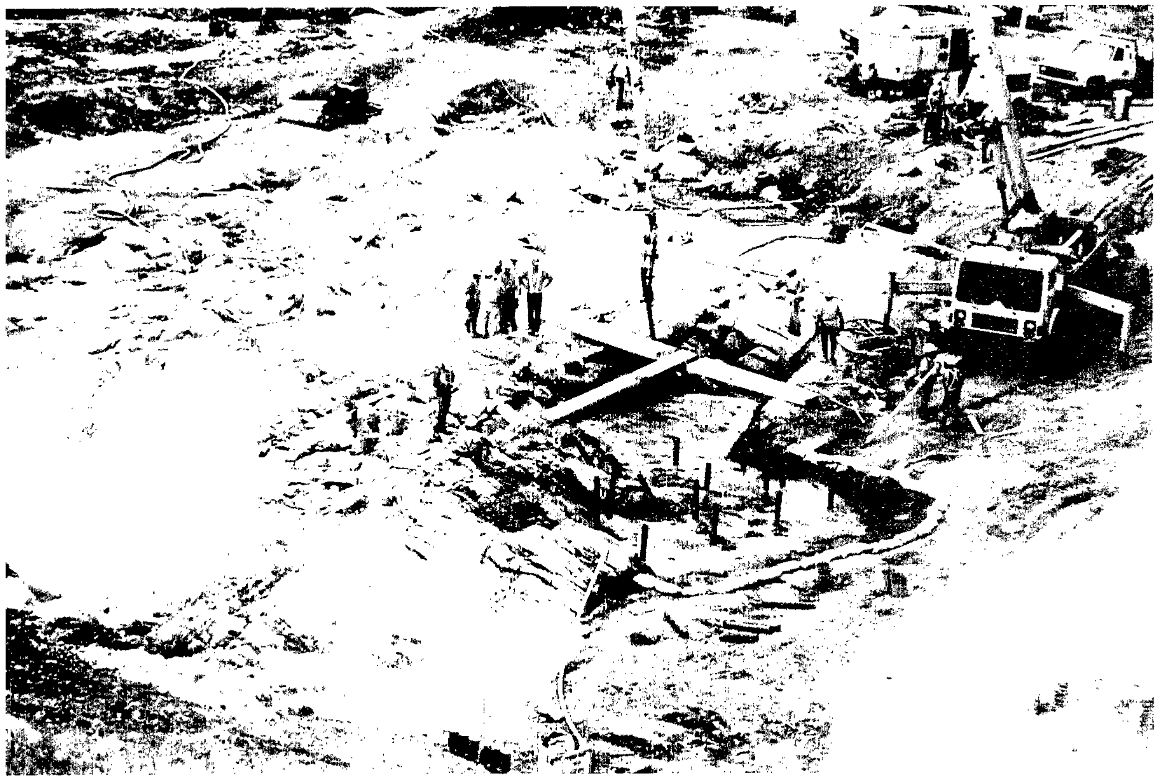
Reservoir Borrow Area. (Looking Upstream from the Left Abutment)

NO. 25 - AUGUST 14, 1990.

Core Trench Invert (About Station 14+50 to 15+50), During Final Clean-up. Red Lines Indicate Limit of Concrete Placements.

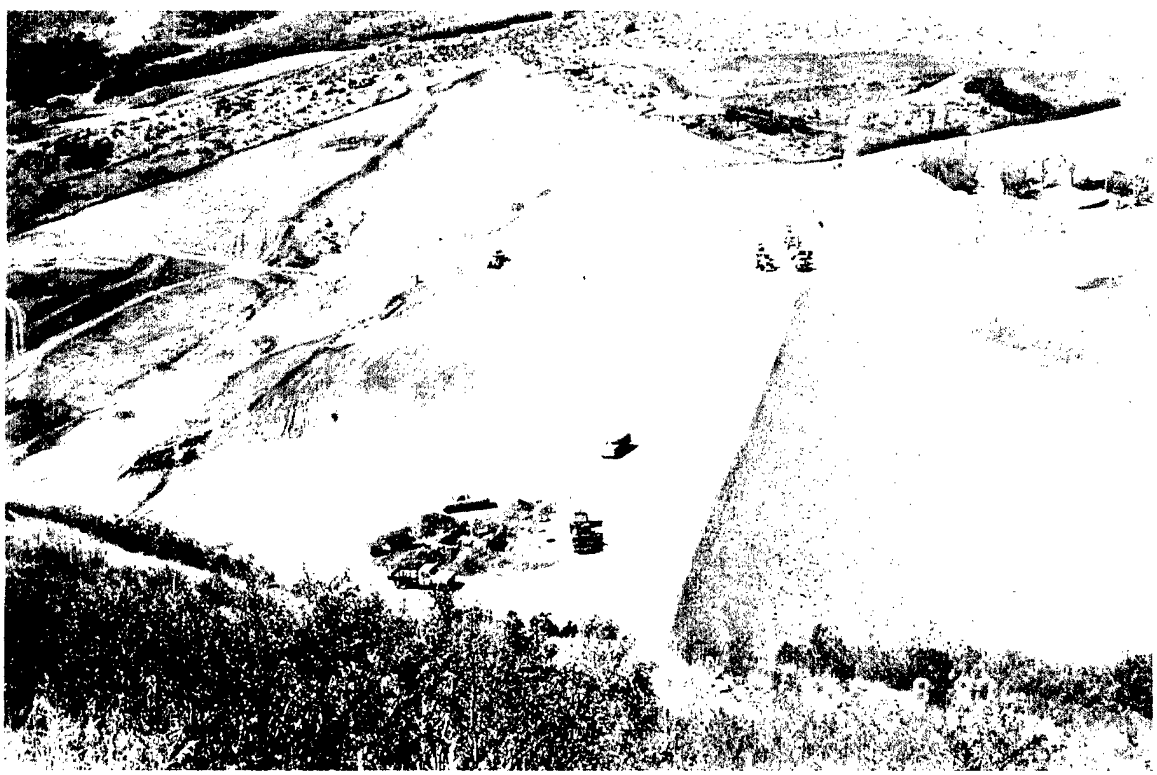


NO. 26 - AUGUST 15, 1990.
Core Trench Invert. Final Clean-up, Excavation and Geologic Mapping in Progress. (Looking Right from near the Base of the Left Abutment)



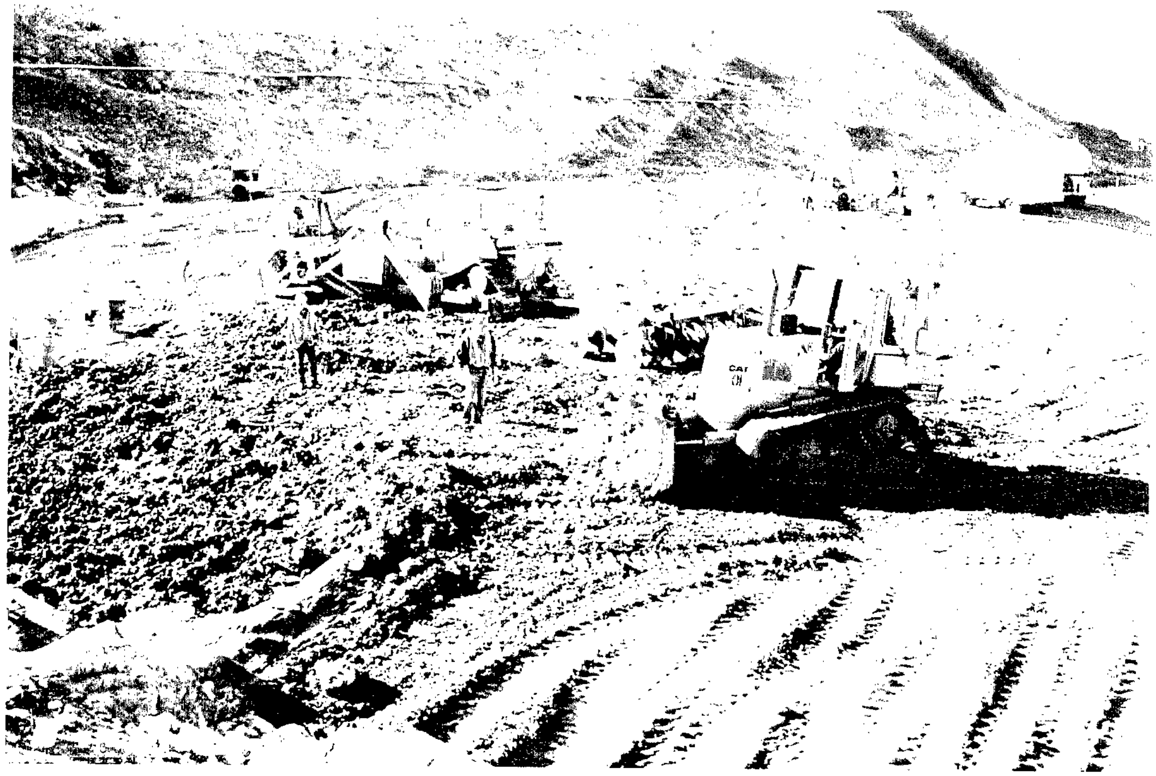
NO. 27 - AUGUST 17, 1990.

Core Trench Invert. Concrete Placement in Progress. Notice Extent of Previous Placements.



NO. 28 - SEPTEMBER 8, 1990.

Record Sample Test Pit. Random II, Cofferdam.

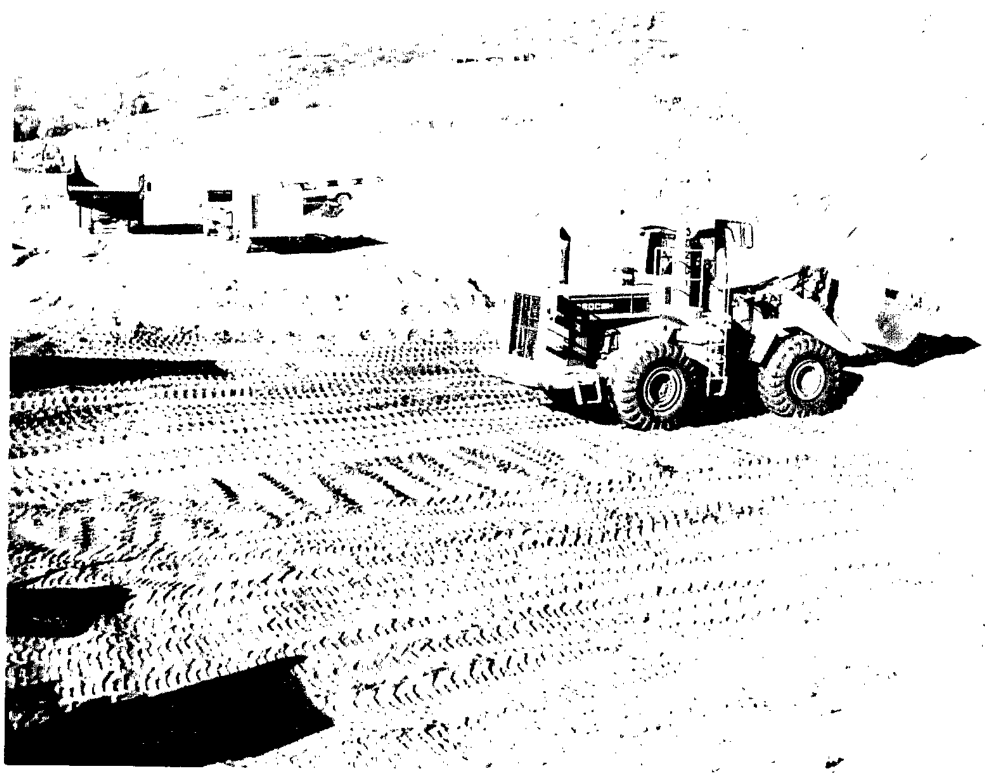


NO. 29 - SEPTEMBER 22, 1990.

Initial Impervious Core Placement. Spreading with a Cat D4 and D6. Scarifying with Disk and Backhoe Bucket Teeth.

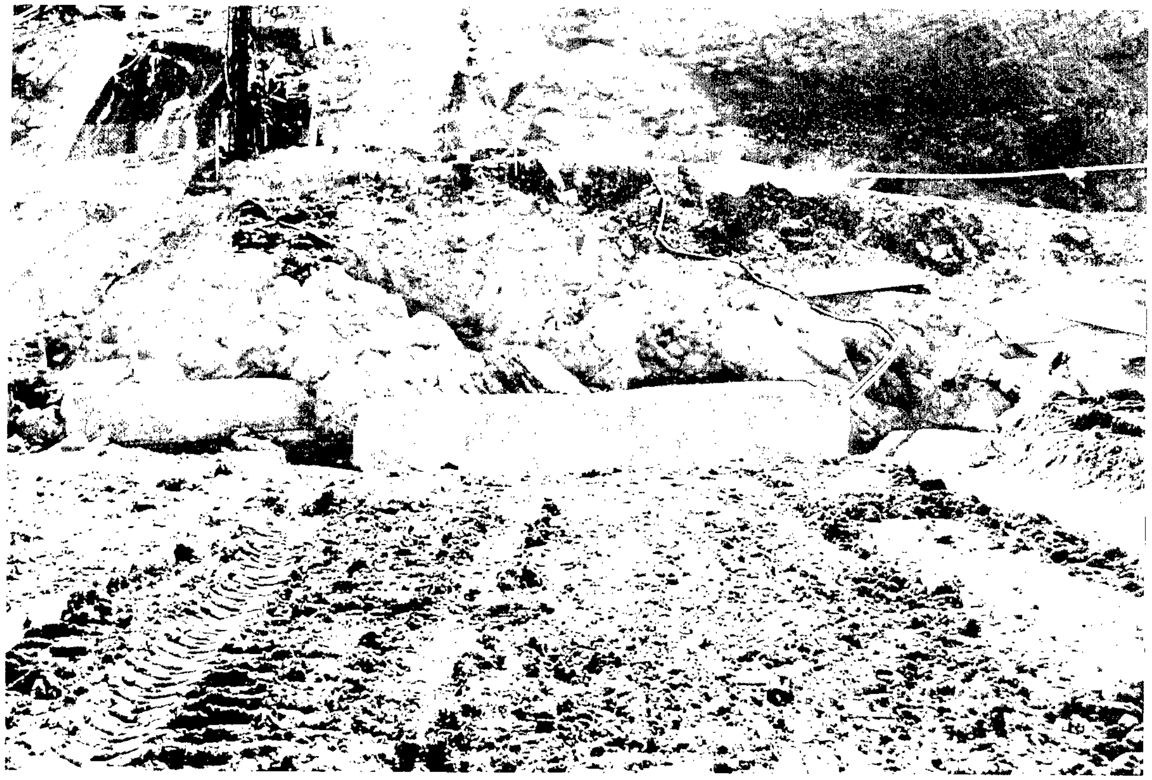
NO. 30 - SEPTEMBER 22, 1990.

Initial Impervious Core Compaction. Wheel Rolling with Cat 950B Rubber Tired Loader.

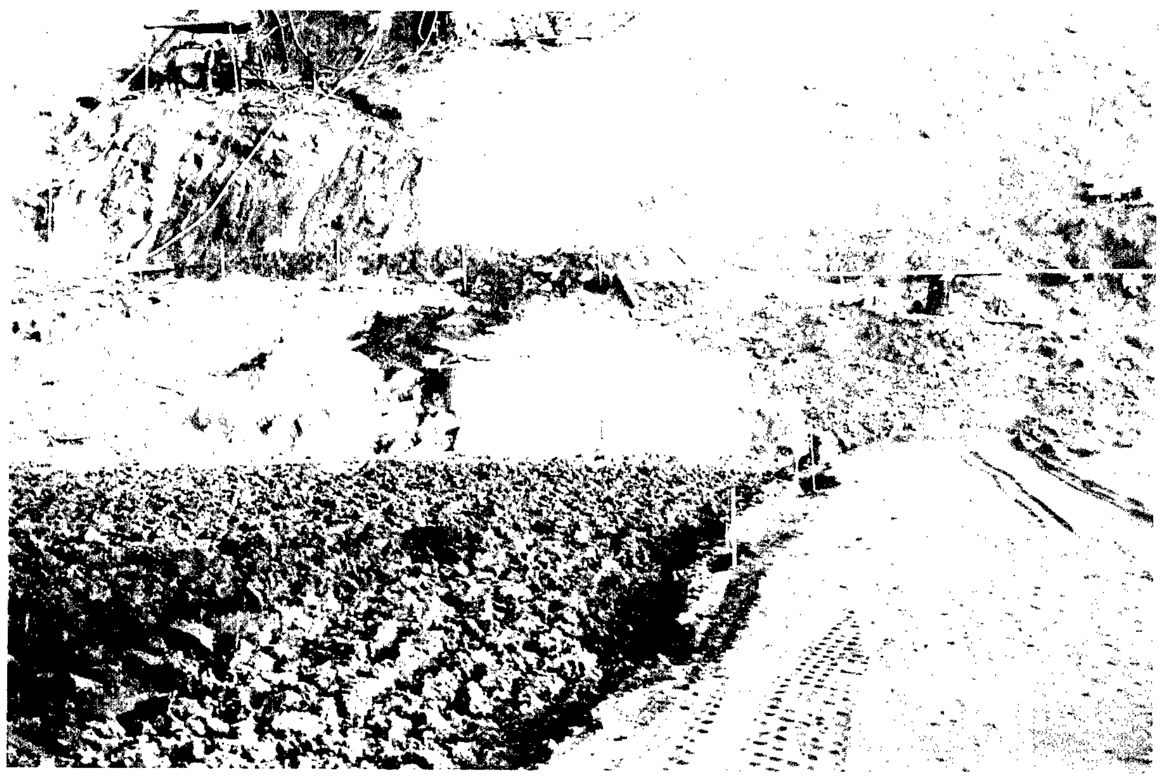


NO. 31 - SEPTEMBER 22, 1990.

Initial Impervious Core Compaction. Wheel Rolling with Cat 980C Rubber Tired Loader.



NO. 32 - OCTOBER 4, 1990.
Concrete Fillets at the Base of the Left Abutment, Core Trench Foundation Shaping & Seepage Protection. (Downstream is to the Right in the Photo)

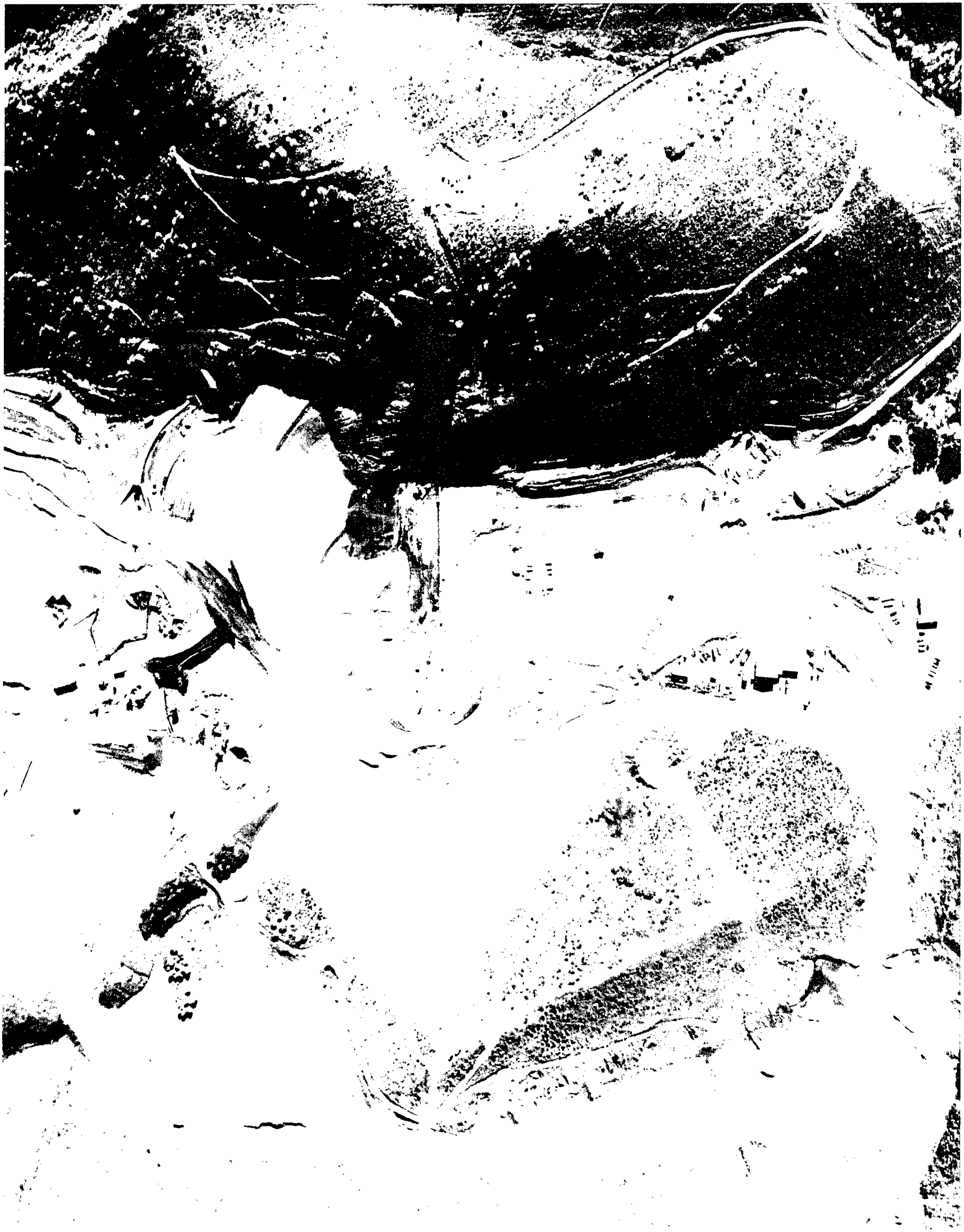


NO. 33 - OCTOBER 15, 1990.

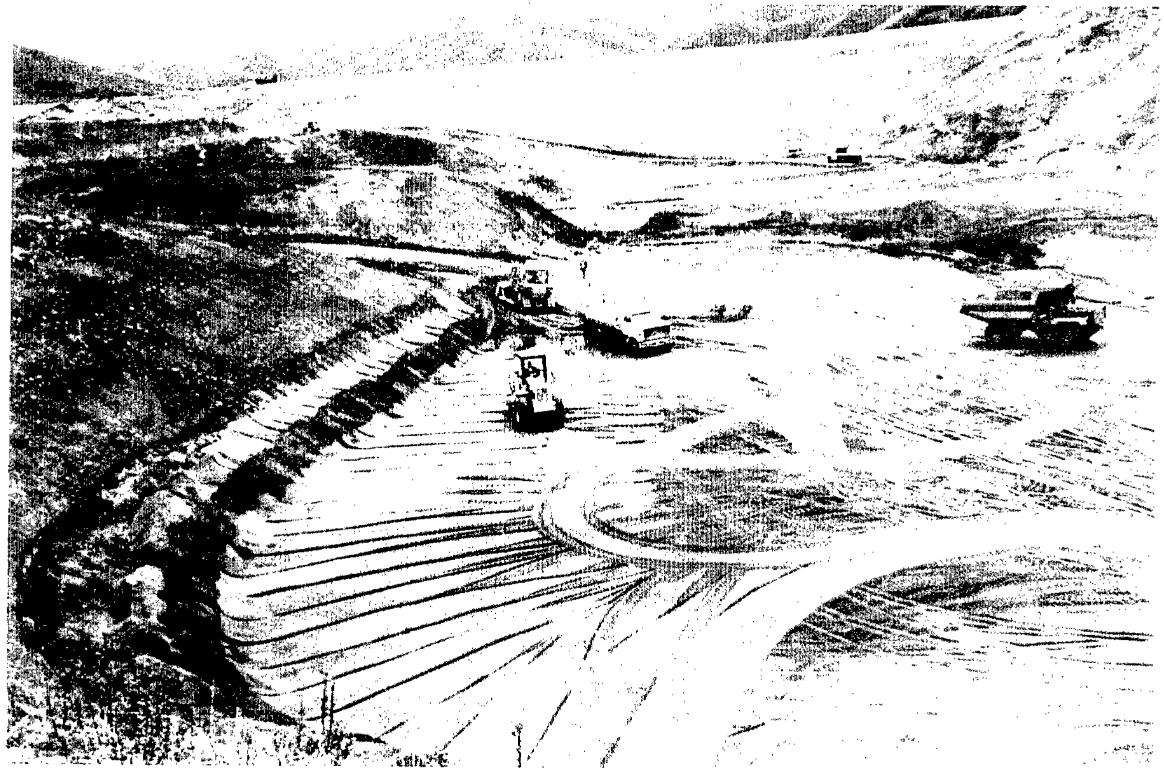
Concrete Fillets at the Base of the Left Abutment, Core Trench Foundation Shaping & Seepage Protection. (Downstream is to the Right in the Photo)

NO. 34 - OCTOBER 17, 1990.

Left Abutment, Cofferdam, Impervious Core and Horizontal (Blanket) Drain from the Top of the Right Abutment. This is near to the end of the 1990 Construction Season.



NO. 35 - END OF CONSTRUCTION 1990 AERIAL VIEW.

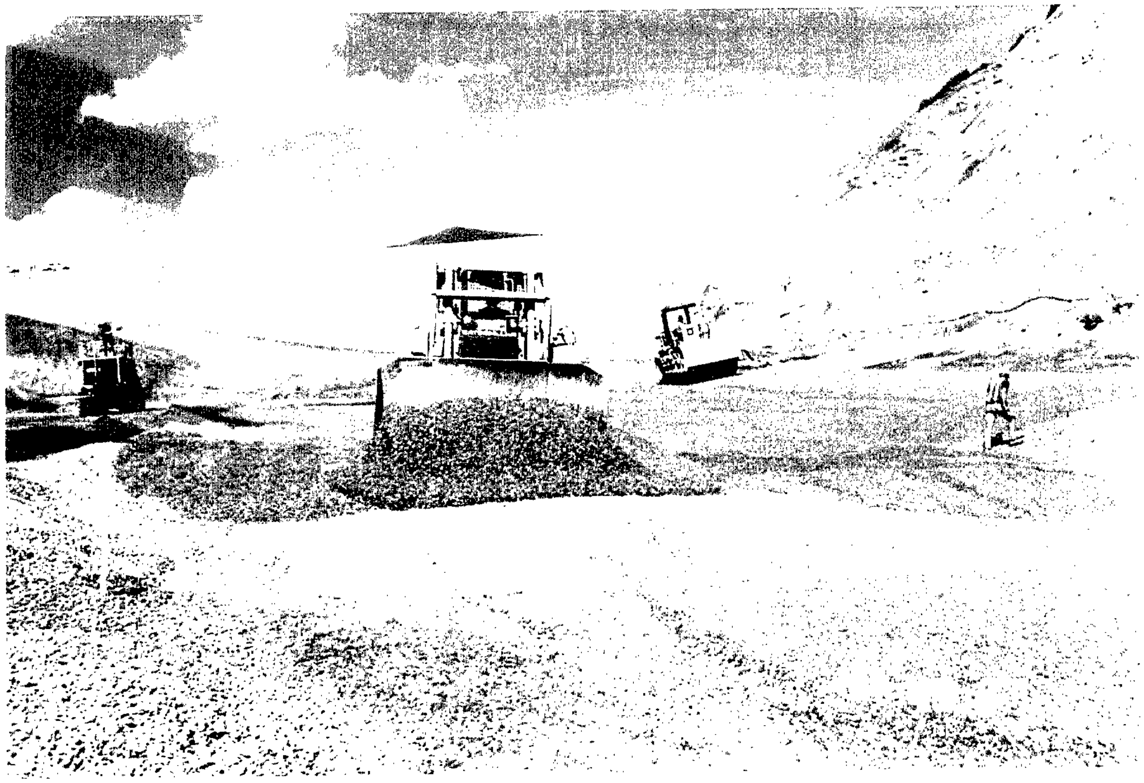


NO. 36 - MAY 18, 1991.

Horizontal (Blanket) Drain Placement, Downstream Right Side of the Streambed Area. (Looking Upstream)

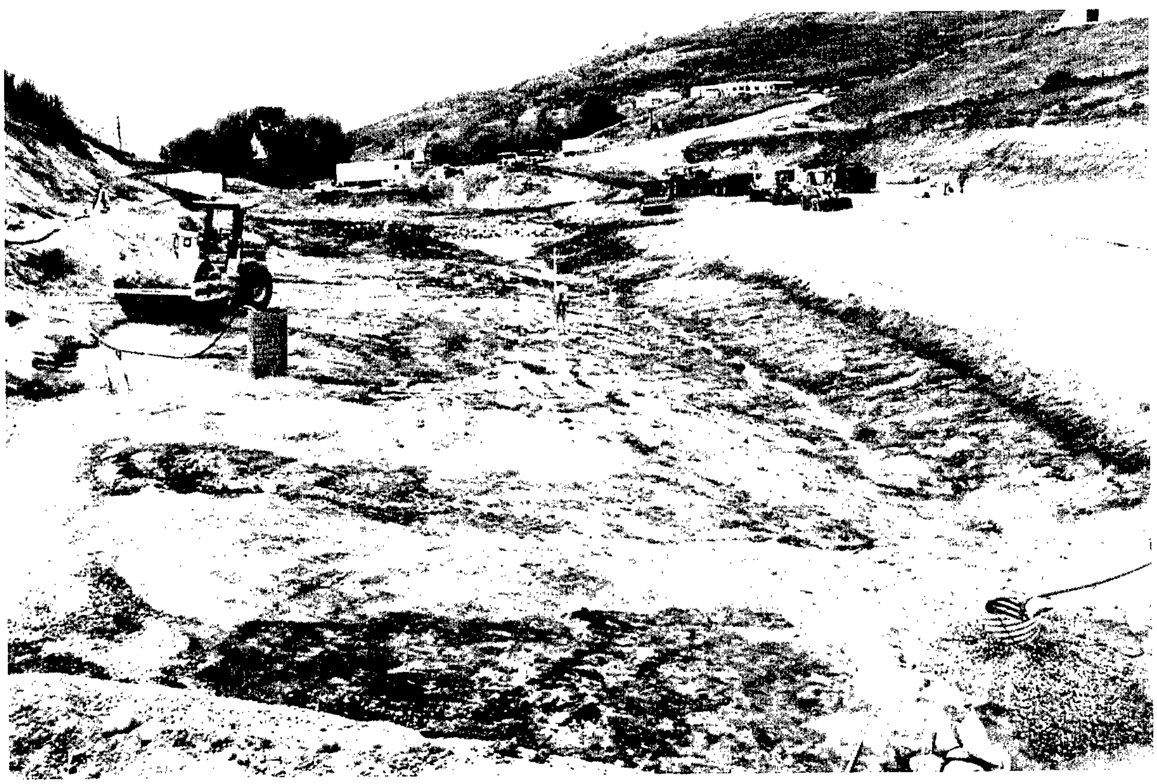
NO. 37 - MAY 24, 1991.

Horizontal (Blanket) Drain Placement, Downstream Streambed Area. (Looking Downstream from the Top of the Cofferdam)



NO. 38 - MAY 24, 1991.

Horizontal (Blanket) Drain. Spreading and Compacting Drainage Fill I.



NO. 39 - JUNE 4, 1991.

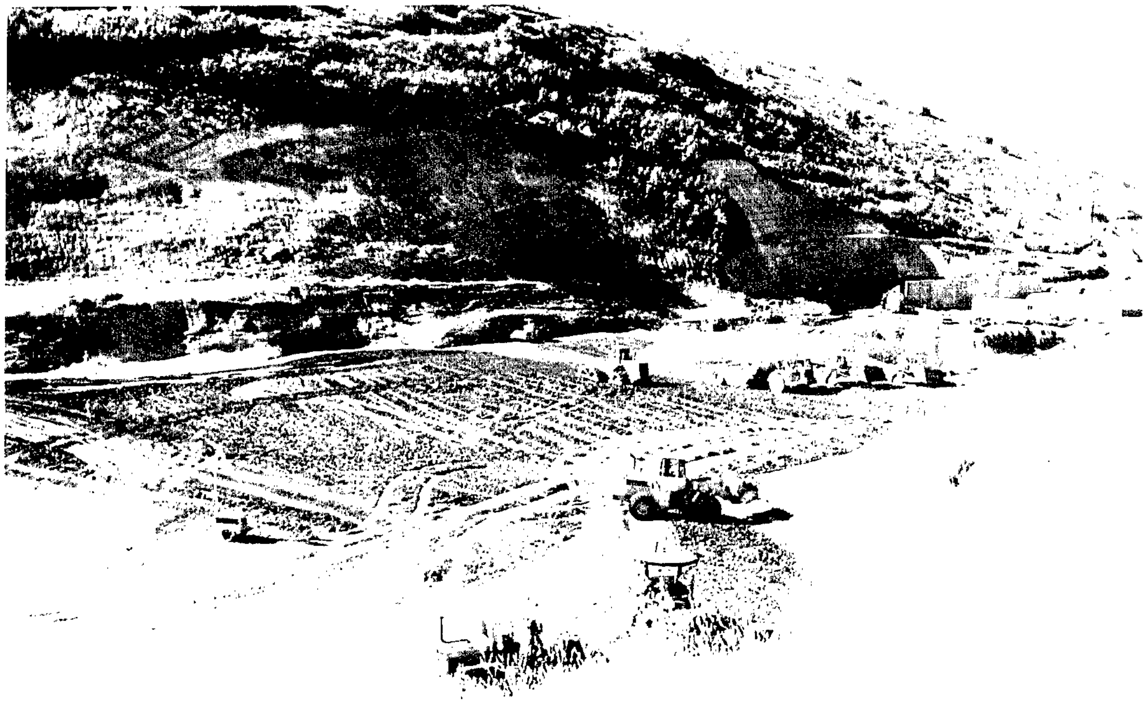
Left Side of the Downstream Streambed Foundation with Gravel and CMP Sumps. Geologic Mapping in Progress. (Looking Downstream) Lowest Foundation Areas.

NO. 40 & 41 - JUNE 5, 1991.

Downstream Streambed Final Excavation in Progress.

NO. 42 - JUNE 5, 1991.

Horizontal (Blanket) Drain Construction in Progress.

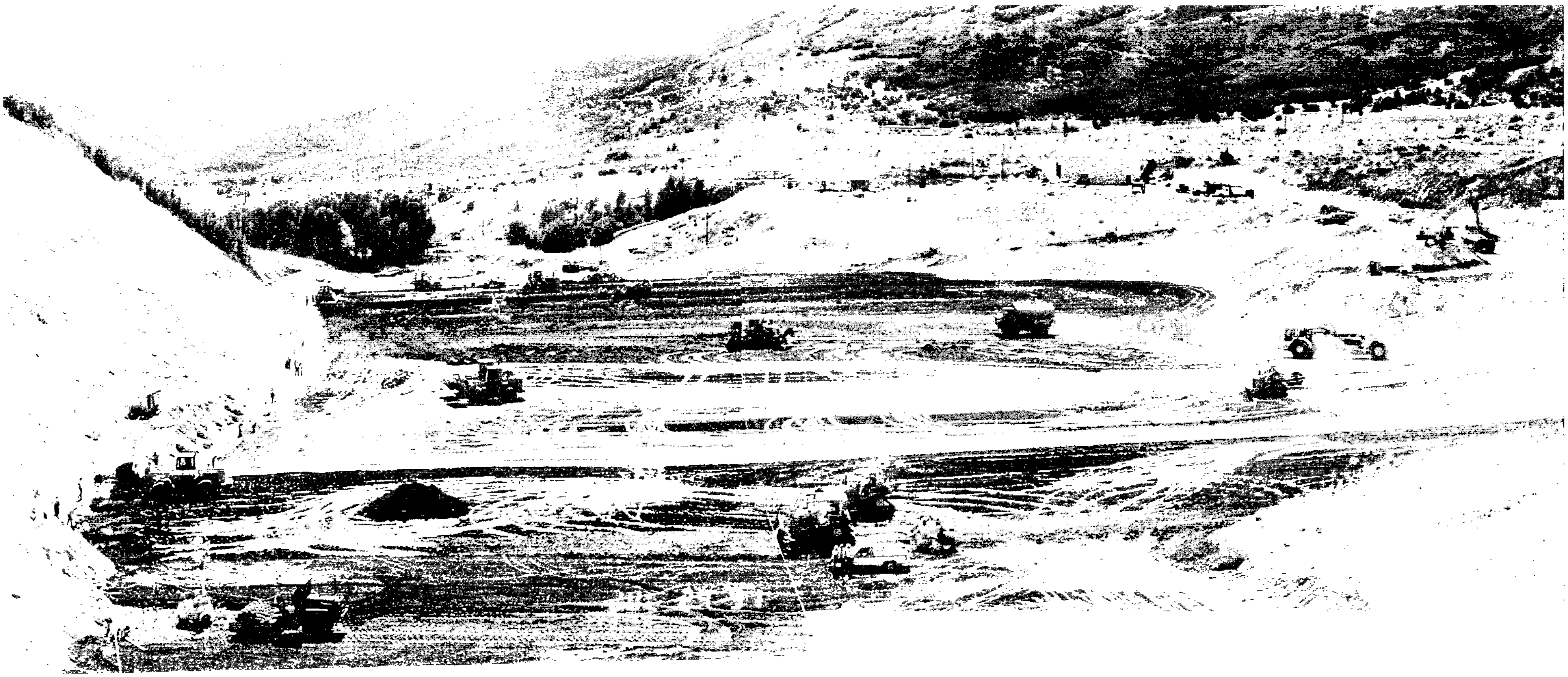


NO. 43 - JUNE 28, 1991.

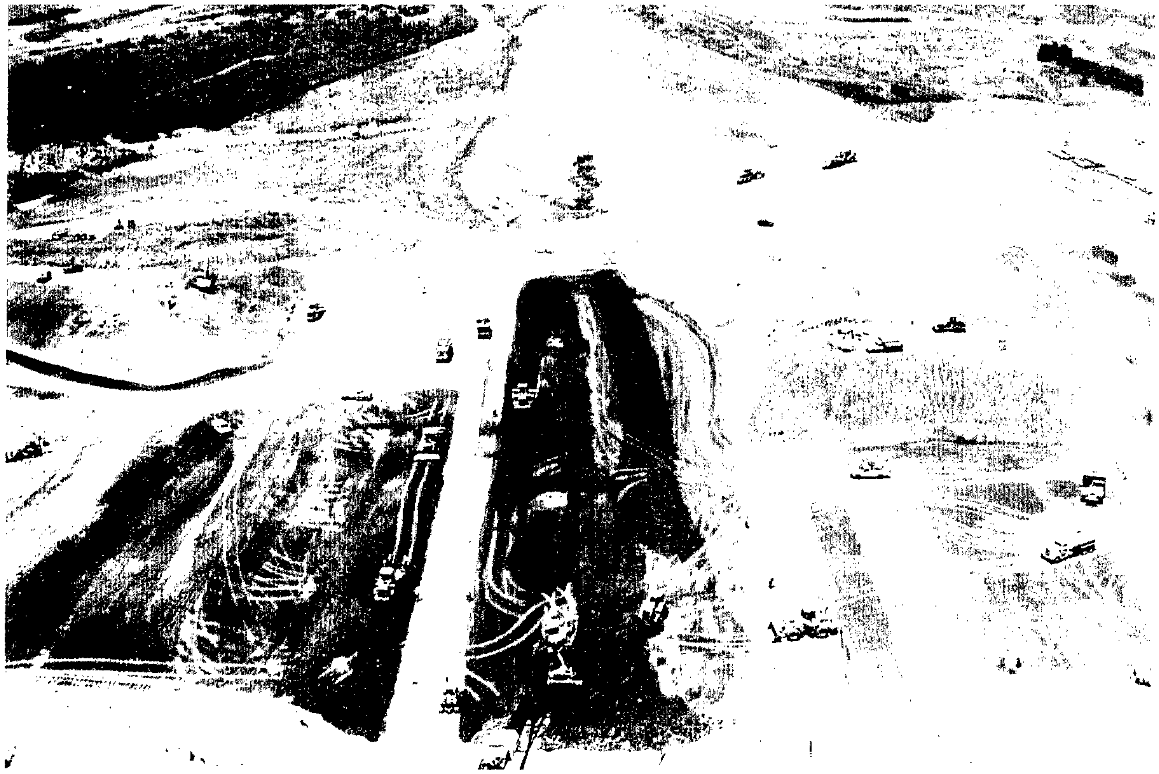
Downstream Shell (Random I Fill) Construction Activities. (Looking Downstream and Left)

NO. 44 - JUNE 28,1991.

Downstream Shell (Random I Fill) Construction Activities (Looking Upstream w/Cofferdam in the Far Background)

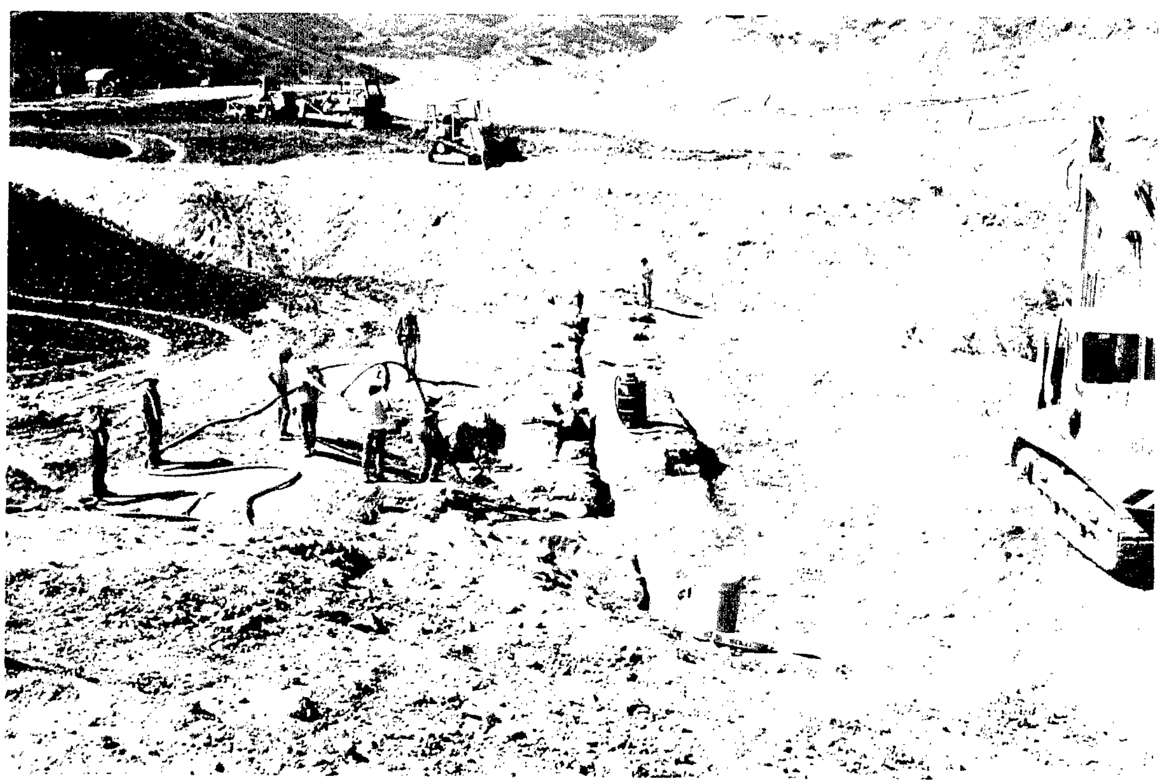


<u>NO. 45 & 46 - JULY 24, 1991</u>. Embankment Activities. Notice Impervious Core Placement with the Rubber Tired Loader, Random II Compaction with an IR SPF60 and the Left Abutment Horizontal Drain Placement. Approximate Fill Elevation is 5605 ft.



NO. 47 - JULY 29, 1991.

Embankment Activities. Notice the Configuration of the Inclined Drain. (Looking Right from the Top of the Left Abutment)

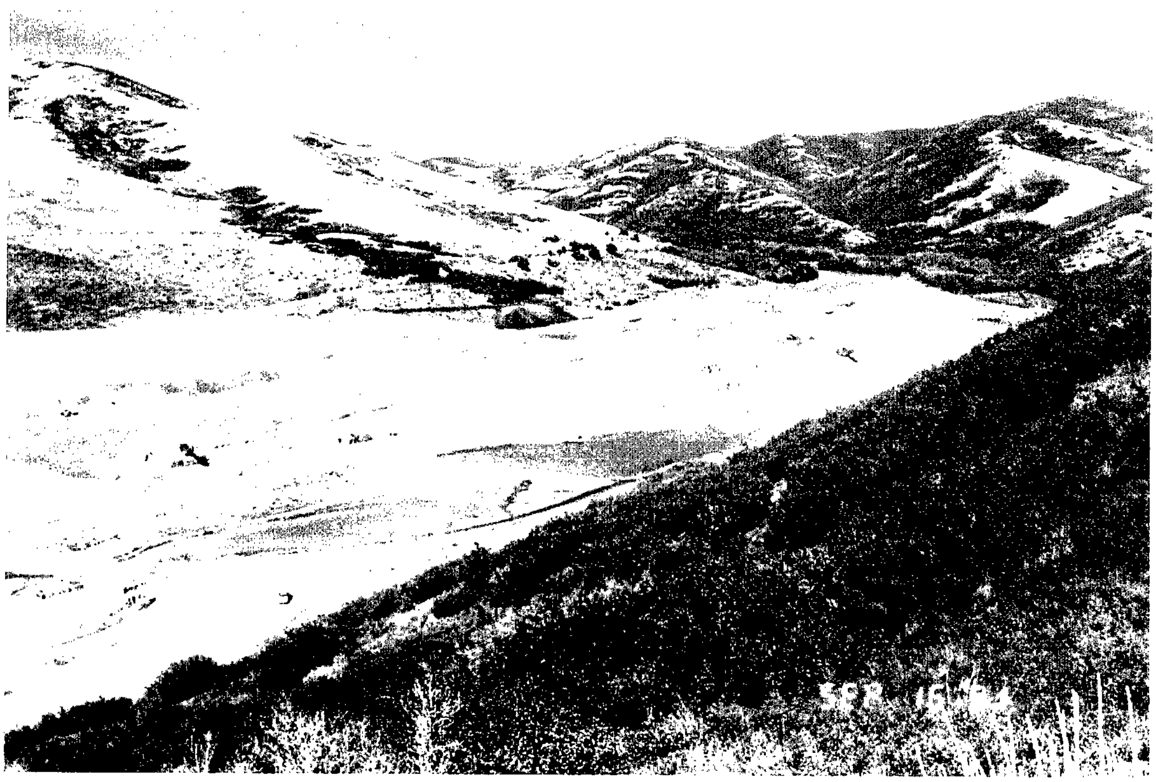


NO. 48 - AUGUST 17, 1991.

Final Clean-up, Core Trench Invert. Blowing with High Pressure Air.

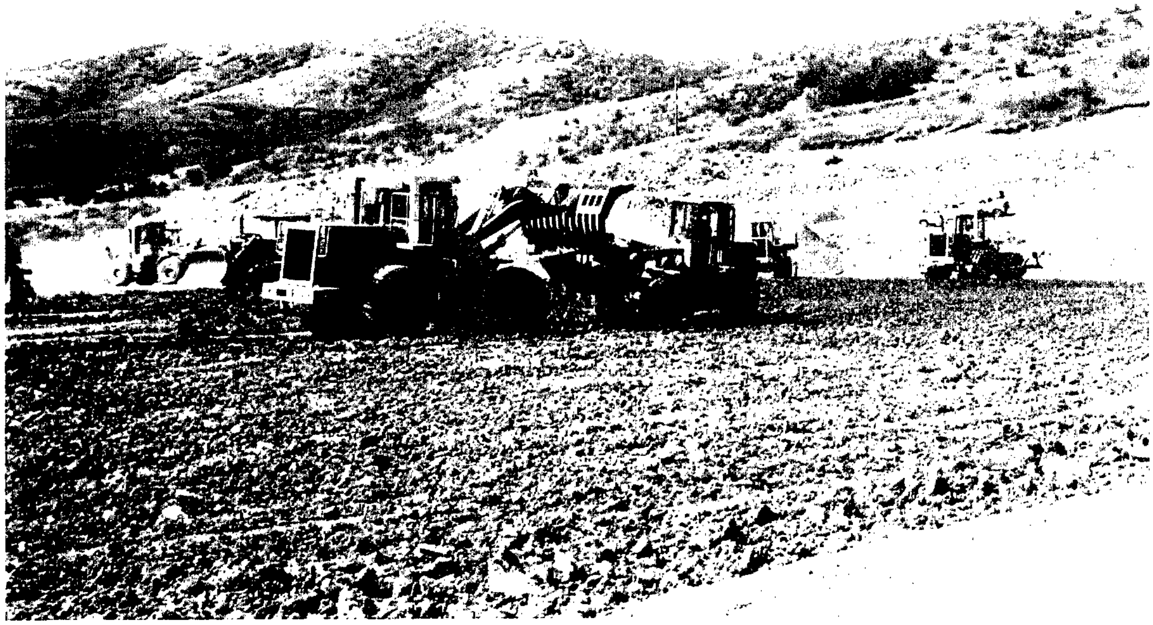
NO. 49 - SEPTEMBER 16, 1991.

Embankment Activities. Approximate Fill Elevation is 5640 feet.



NO. 50 - SEPTEMBER 16, 1991.

Reservoir Borrow Area from the Left Abutment.



NO. 51 - SEPTEMBER 18,1991.

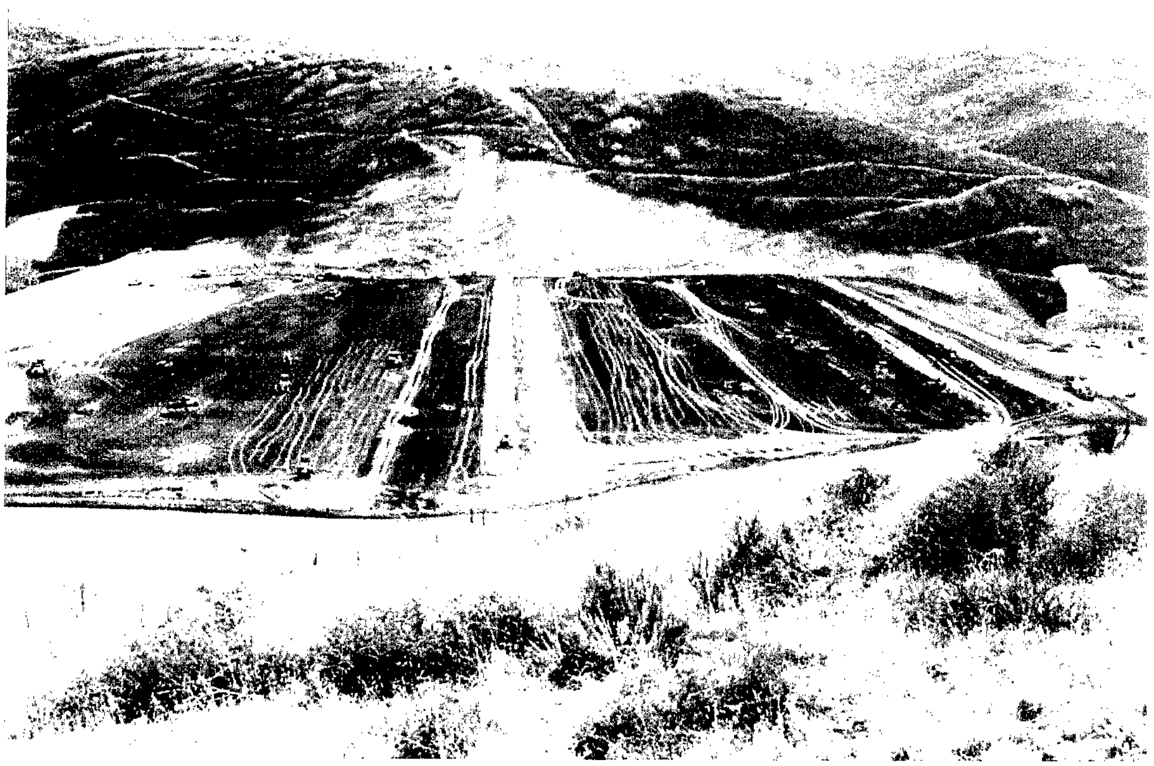
Rock Raking Operation on the Random II, Upstream Shell.

NO. 52 - SEPTEMBER 18, 1991.

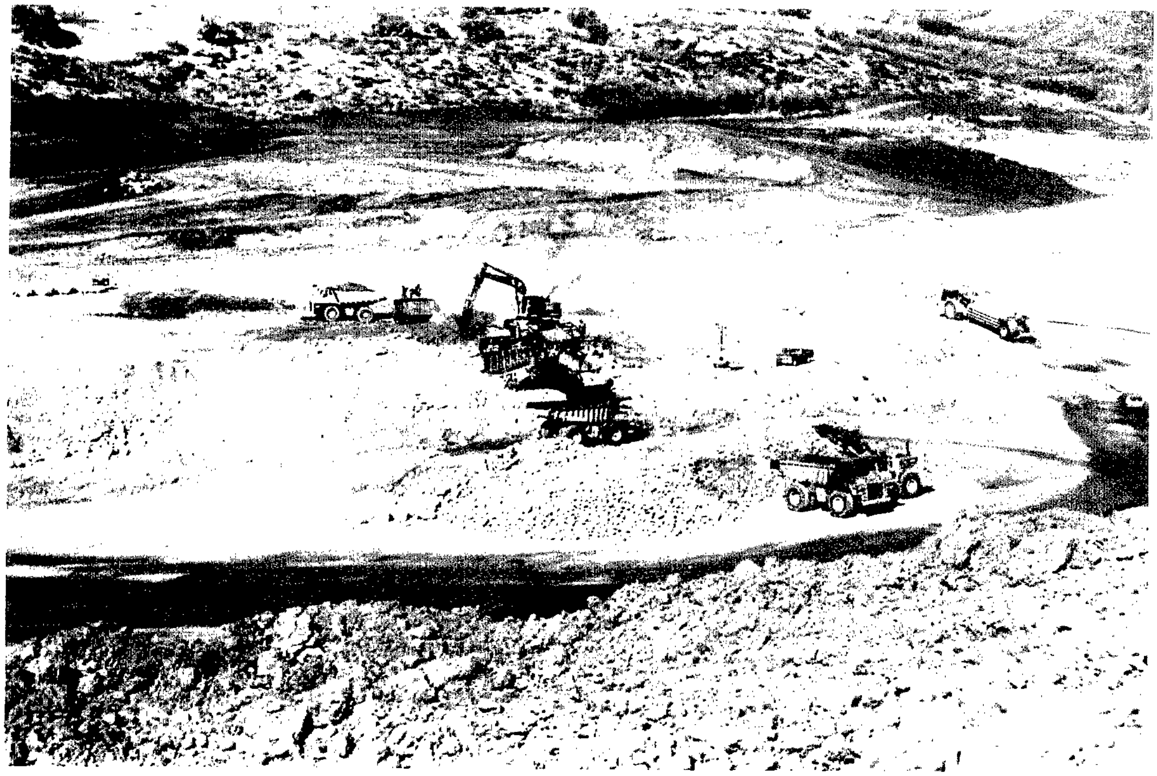
Horizontal (Blanket) Drain Construction at the Right Abutment (Typical).

NO. 53 - OCTOBER 11, 1991.

Random II Embankment Activities. (Looking Right from the Left Abutment) Approximate Fill Elevation is 5665 feet.



NO. 54 - OCTOBER 12, 1991.
Embankment from the Right Abutment near the End of the 1991 Construction Season.



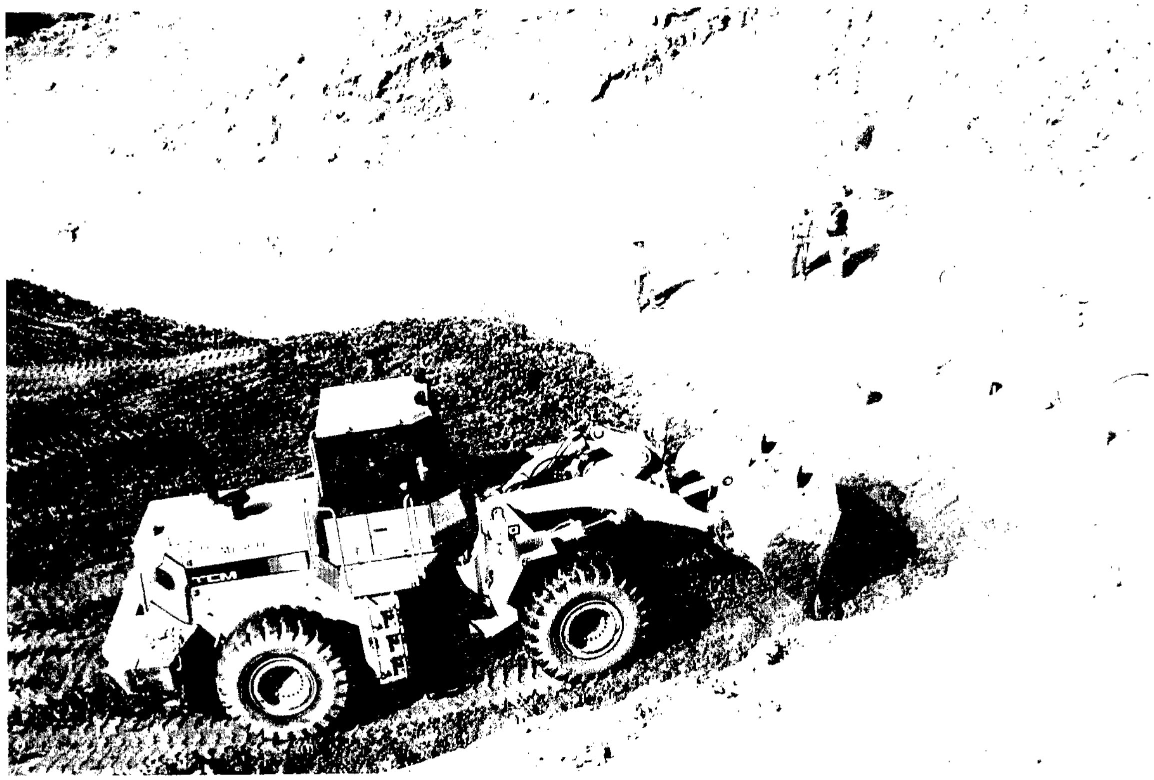
<u>NO. 55 - OCTOBER 20, 1991</u>.

Reservoir Borrow Area. Kolman in Operation.

<u>NO. 56 - NOVEMBER 1, 1991</u>.

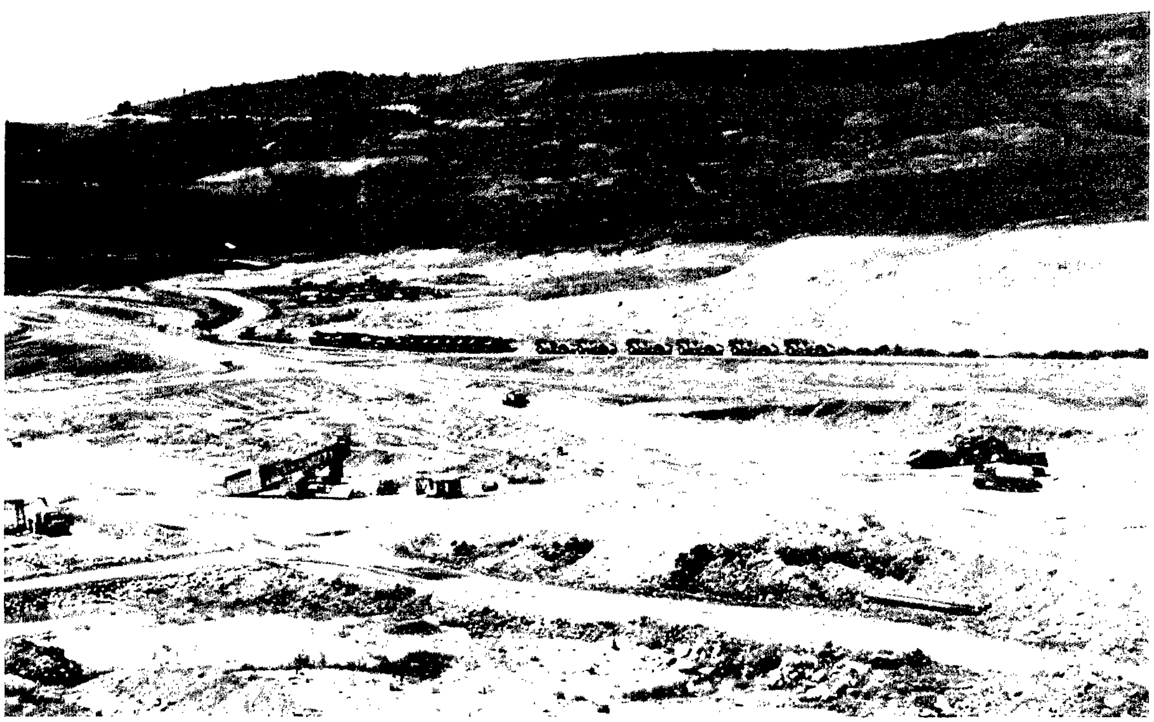
Record Sampling Impervious Core.

NO. 57 - END OF CONSTRUCTION 1991 AERIAL VIEW.



NO. 58 - APRIL 26, 1992.

Core Trench Invert, Impervious Core Placement, Right Abutment. Same Loader Used to Wheel Roll the Abutment.

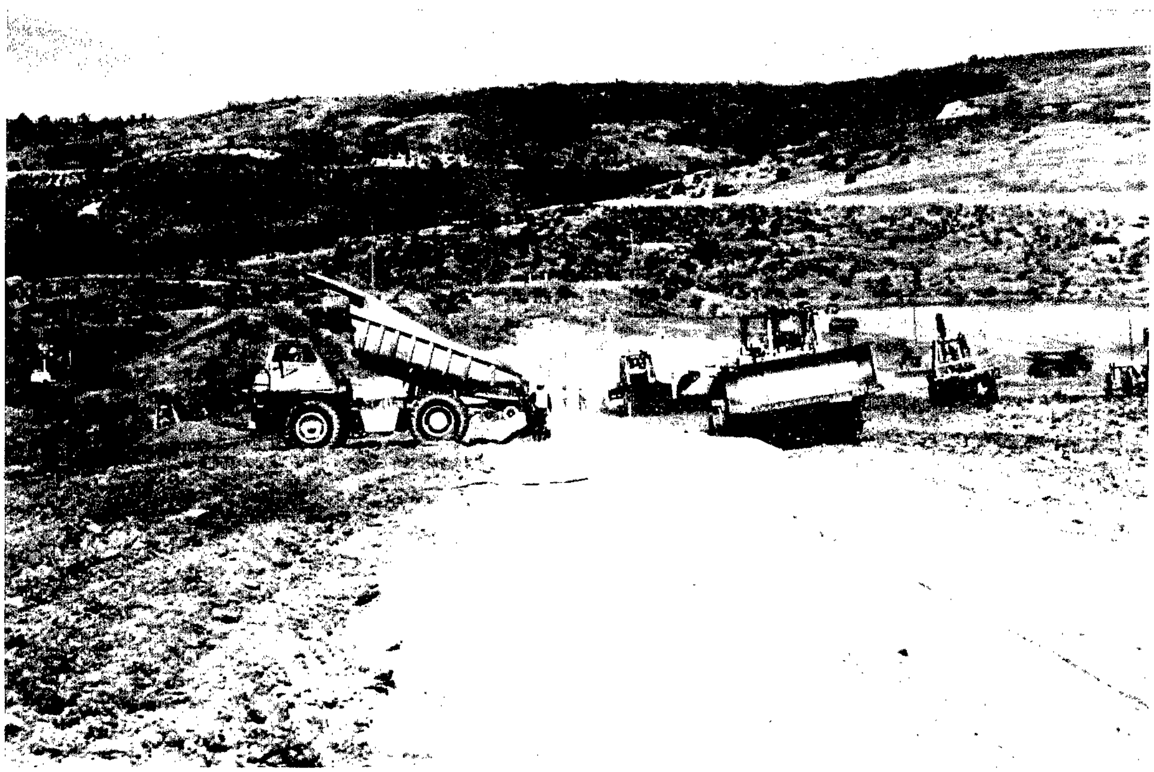


NO. 59 - JULY 13, 1992.

Reservoir Borrow Area and the Fleet of Cat 631 Scrapers, Cat 769 Dump Trucks and Cat 773 Dump Trucks.

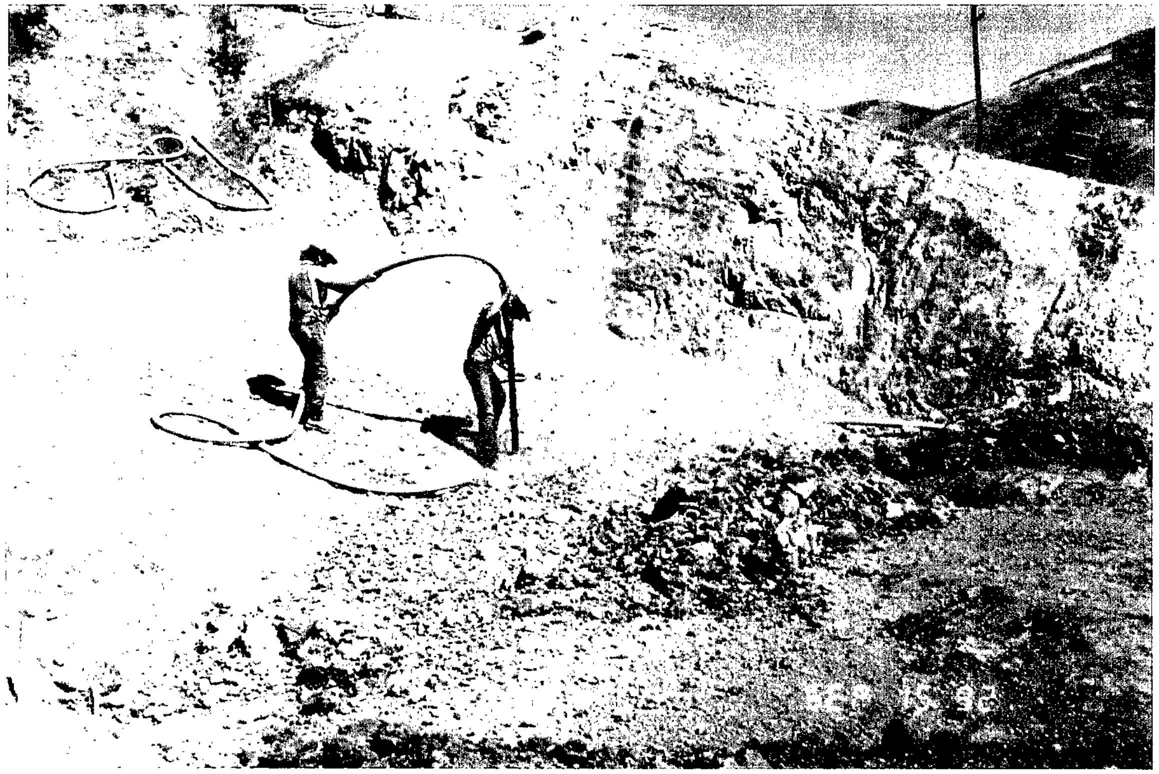
NO. 60 - SEPTEMBER 15, 1992.

Upstream Riprap Placement.



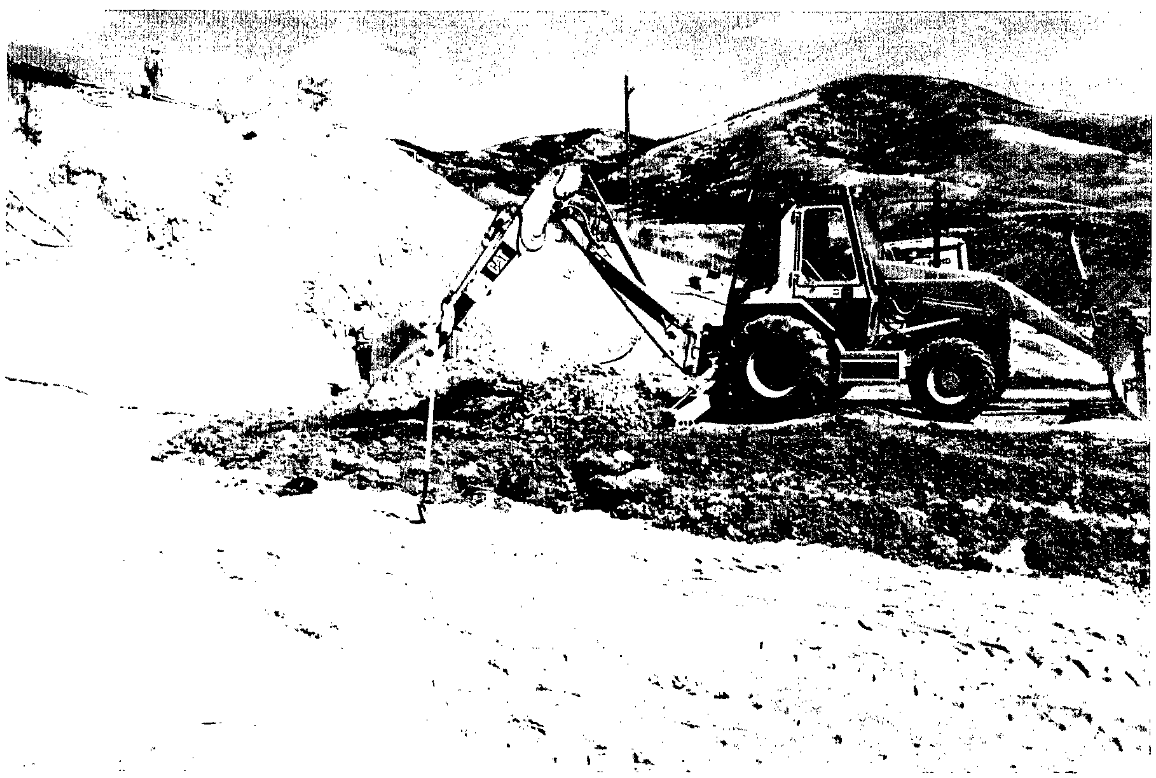
NO. 61 - SEPTEMBER 15, 1992.

Cat 769 Dumping Drainage Fill II on the Inclined Drain.



NO. 62 - SEPTEMBER 15, 1992.

Final Clean-up of the Core Trench Invert with High Pressure Air. Right Abutment.

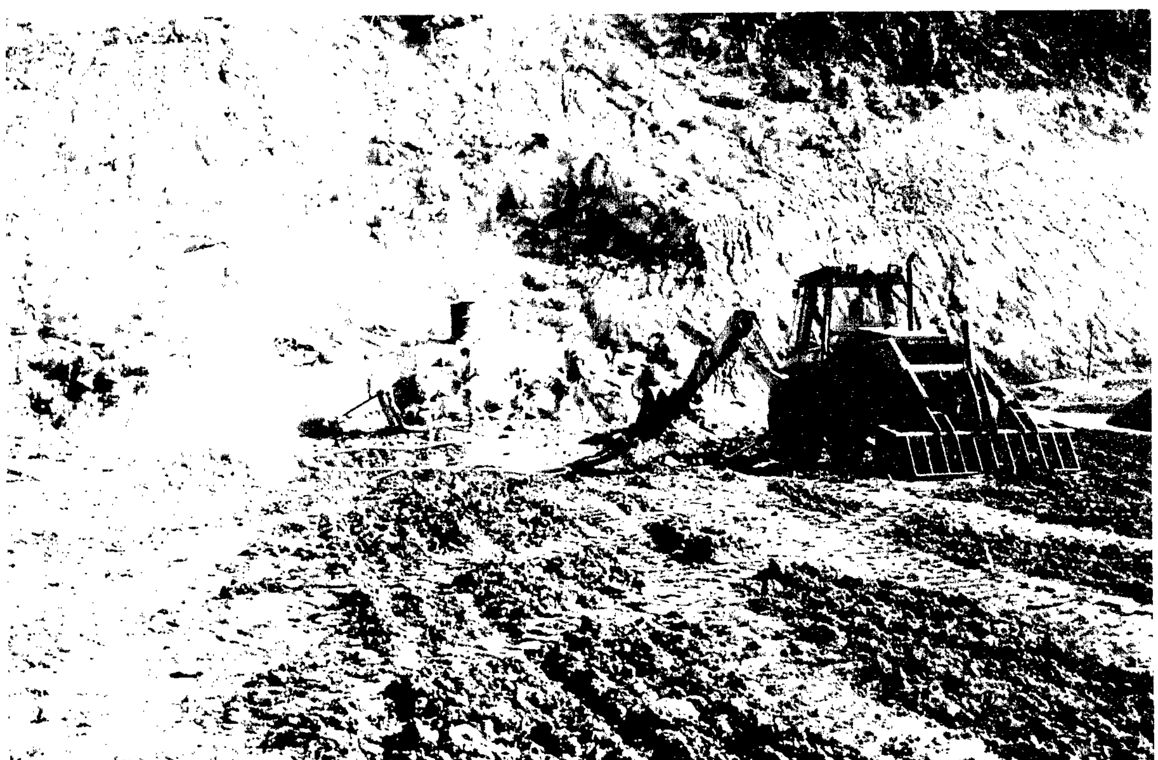


NO. 63 - SEPTEMBER 15, 1992.

Scarifying and Preparing the Impervious Core Prior to Abutment Placement. Right Abutment.

NO. 64 - SEPTEMBER 15, 1992.

Embankment Activities from the Top of the Left Abutment. Approximate Fill Elevation is 5780 feet.

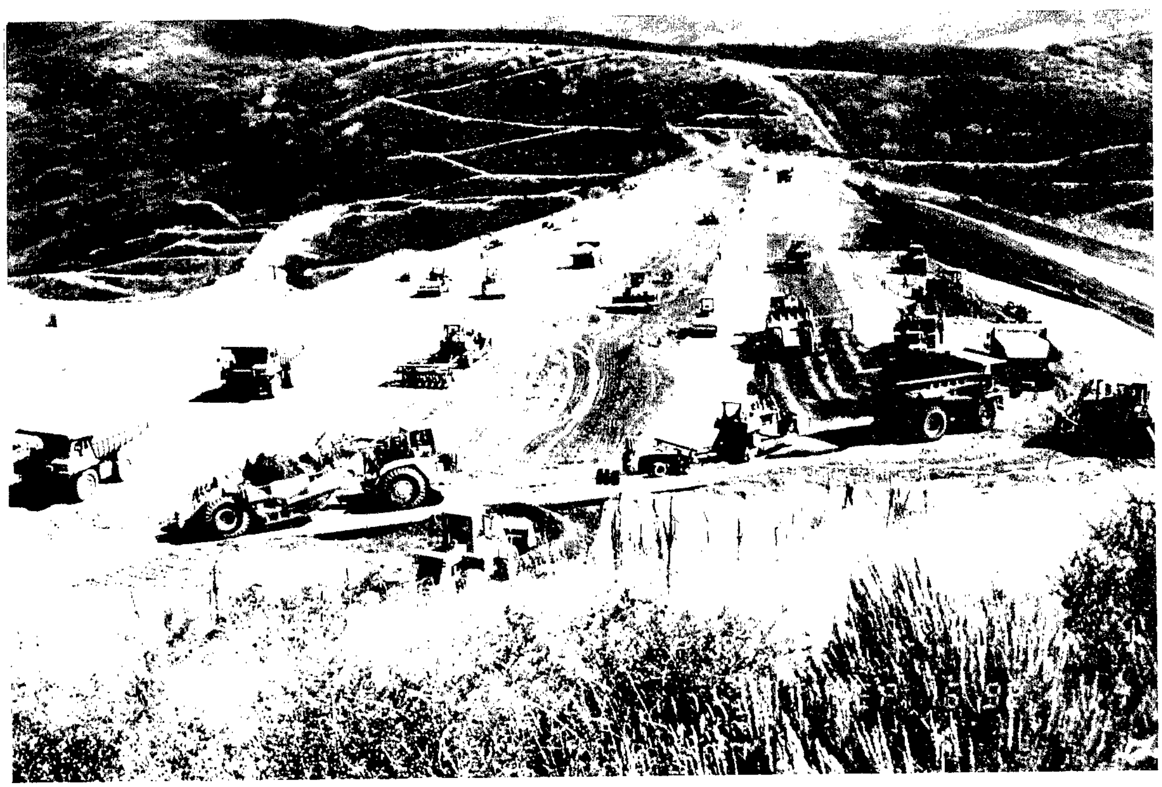


NO. 65 - SEPTEMBER 16, 1992.

Left Abutment Core Trench Invert Preparation. Notice the Concrete Fillet.

NO. 66 - SEPTEMBER 16, 1992.

Embankment Activities from the Top of the Right Abutment.



NO. 67 - SEPTEMBER 16, 1992.

Embankment Activities from the Top of the Right Abutment.

NO. 68 - SEPTEMBER 25, 1992.

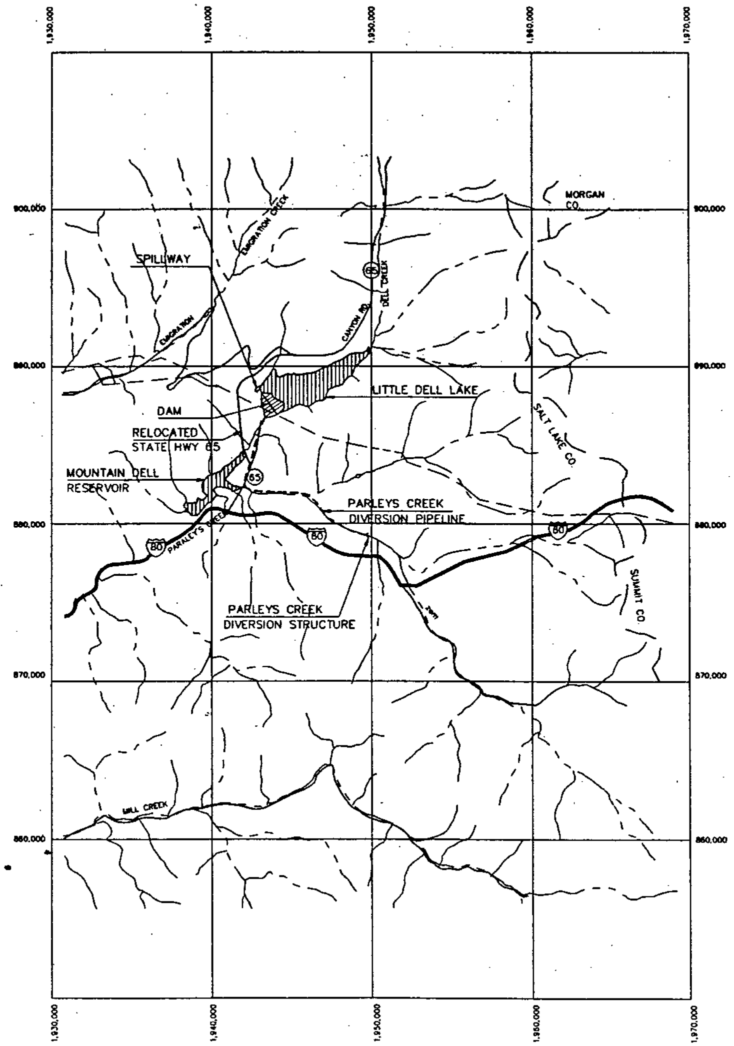
Embankment from the Right Abutment Near the End of the 1992 Construction Season. Approximate Fill Elevation is 5795 feet.

NO. 69 - NEAR THE END OF CONSTRUCTION 1992 AERIAL VIEW.

NO. 70 - OCTOBER 27, 1993.
Downstream Side of Completed Dam

NO. 71 - OCTOBER 27, 1993.
Upstream Side of Completed Dam

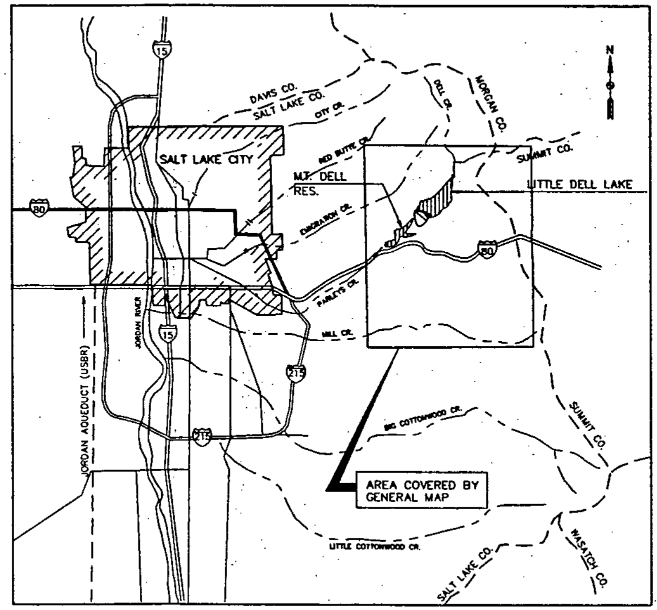
PLATES



GENERAL MAP

SCALE: 1" = 8000 FT.

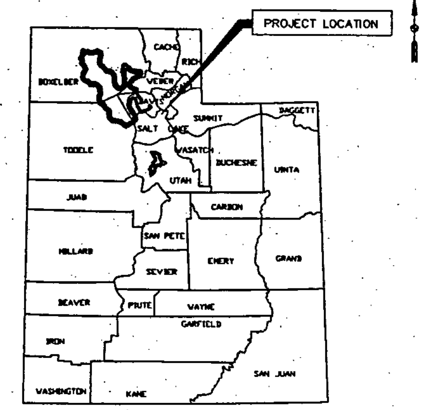
0 2 4 6 8 1000



LOCALITY MAP

SCALE IN MILES

3 0 3



VICINITY MAP

SCALE IN MILES

0 40 80
20 60 100

LITTLE DELL LAKE
SALT LAKE CITY STREAMS, UTAH

GENERAL LOCATION MAP

DEPARTMENT OF THE ARMY
SACRAMENTO DISTRICT, CORPS OF ENGINEERS
SACRAMENTO, CALIFORNIA

SUBMITTED:	APPROVED:
MICHAEL D. RAMSBOTHAM	RESIDENT ENGINEER

DR. BY	CHECKED BY		
CEB	MDR		PLATE 1

LITTLE DELL PROJECT: PL-01 24 MAY 94 NLB

SCALE 1"=500'

CONTOUR INTERVAL 5'

DATE OF PHOTOGRAPHY SEPT. 9, 1993

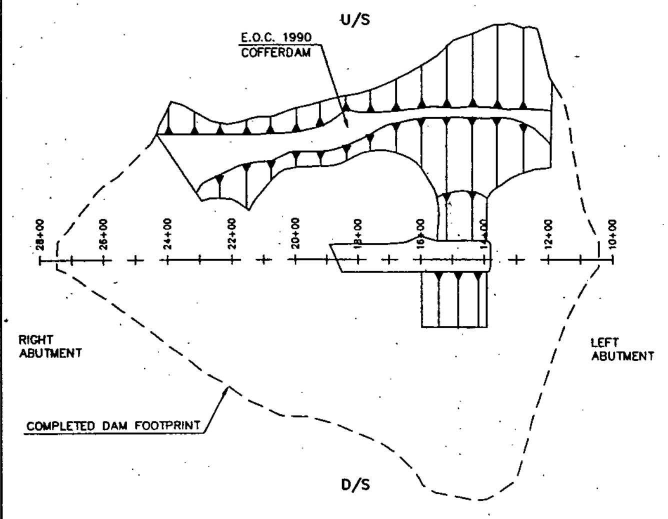
LITTLE DELL LAKE
SALT LAKE CITY STREAMS, UTAH
ORTHO-TOPOGRAPHY
PROJECT PLAN
(General Layout)

DEPARTMENT OF THE ARMY
SACRAMENTO DISTRICT, CORPS OF ENGINEERS
SACRAMENTO, CALIFORNIA

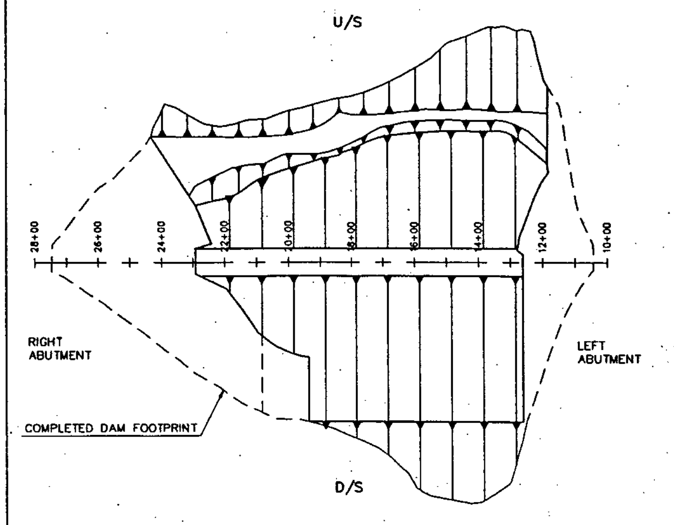
SUBMITTED: MICHAEL R. SAMBOTHAM

NLB | MDR

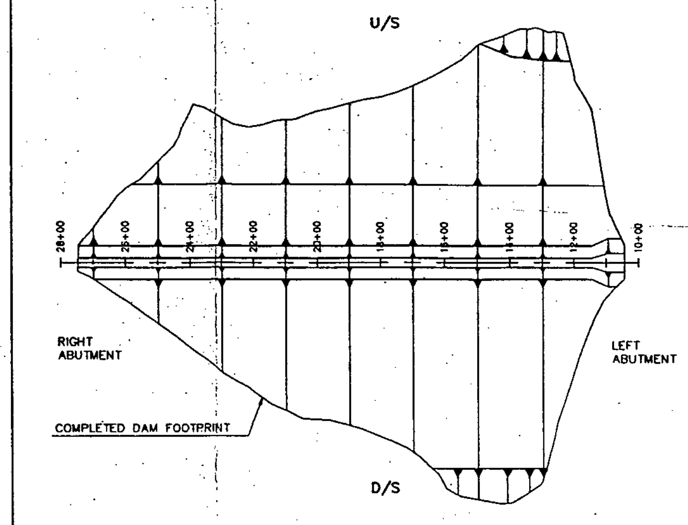
PLATE 2



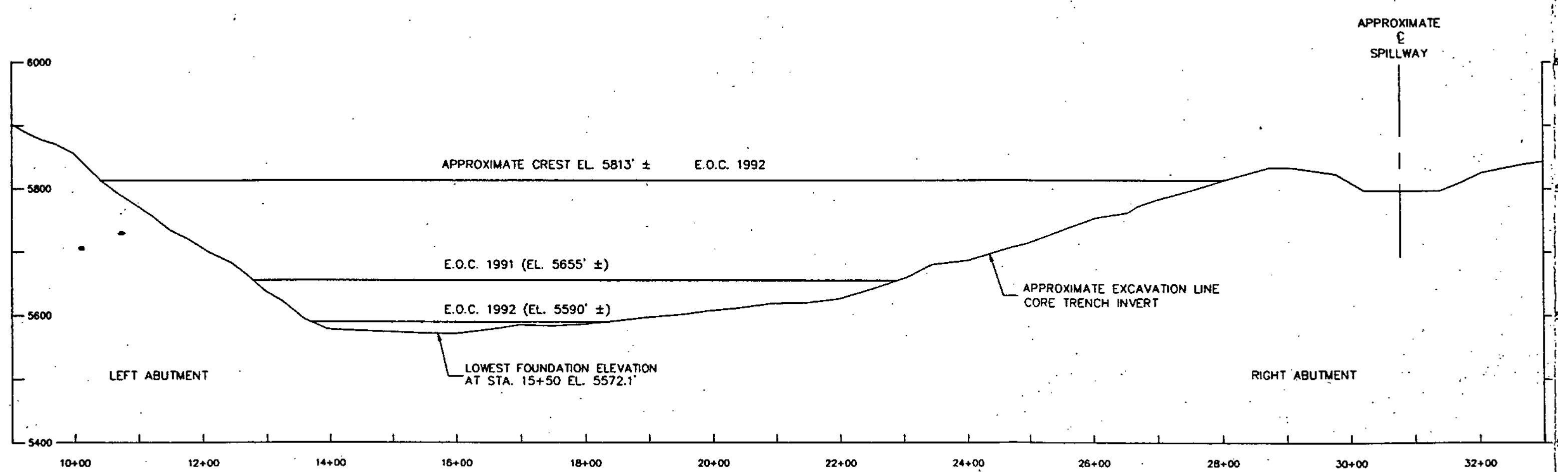
PLAN - E.O.C. 1990
SCALE: 1" = 400'



PLAN - E.O.C. 1991
SCALE: 1" = 400'



PLAN - E.O.C. 1992
SCALE: 1" = 400'



PROFILE ALONG DAM AXIS AT END OF CONSTRUCTION, 1990, 1991, AND 1992
SCALE: 1" = 200'

LEGEND

E.O.C. - END OF CONSTRUCTION

GRAPHIC SCALES

SCALE: 1"=200' 0 100' 200' 300' 400' 500'

SCALE: 1"=400' 0 200' 400' 600' 800' 1000'

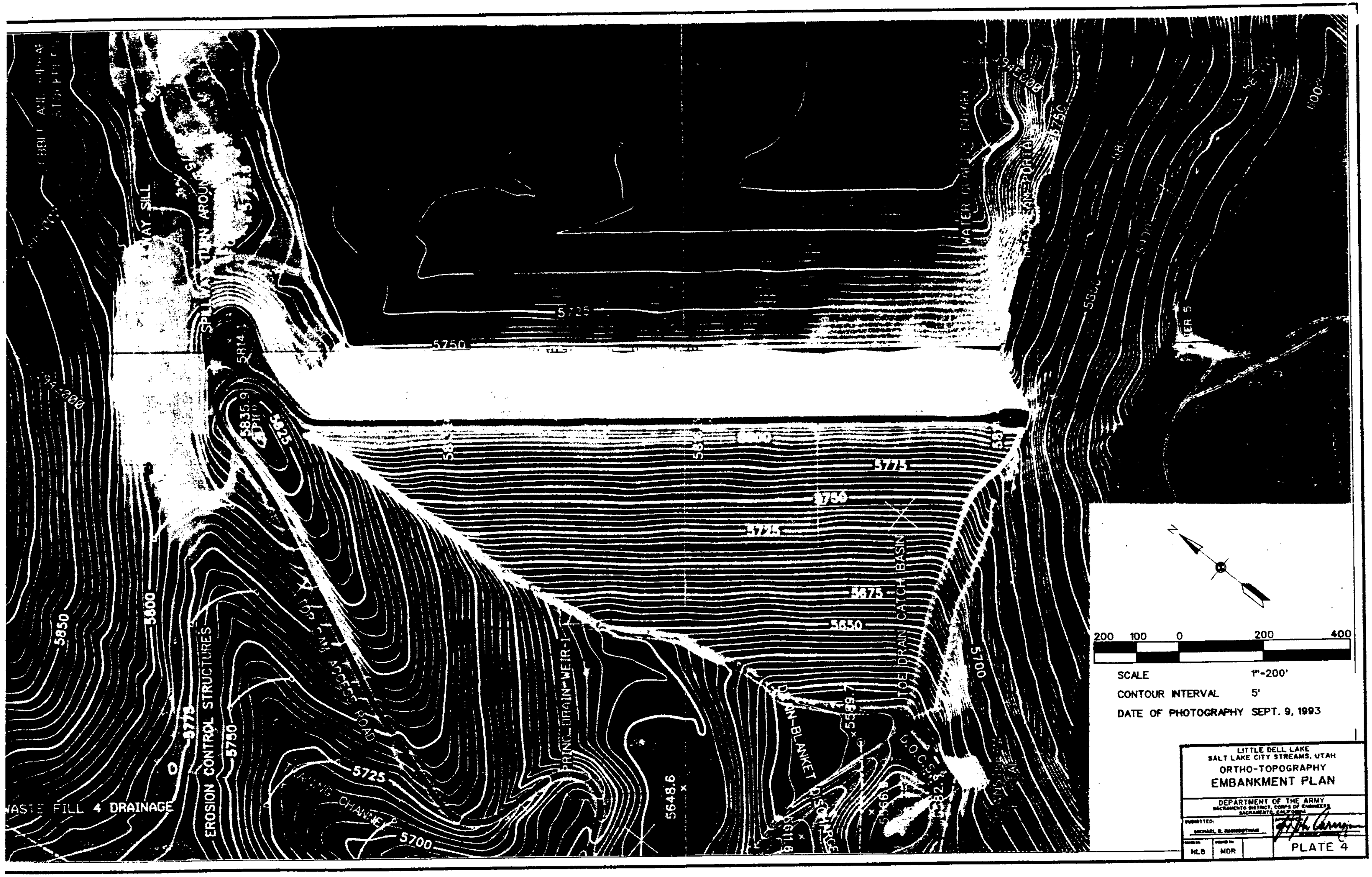
LITTLE DELL LAKE
SALT LAKE CITY STREAMS, UTAH

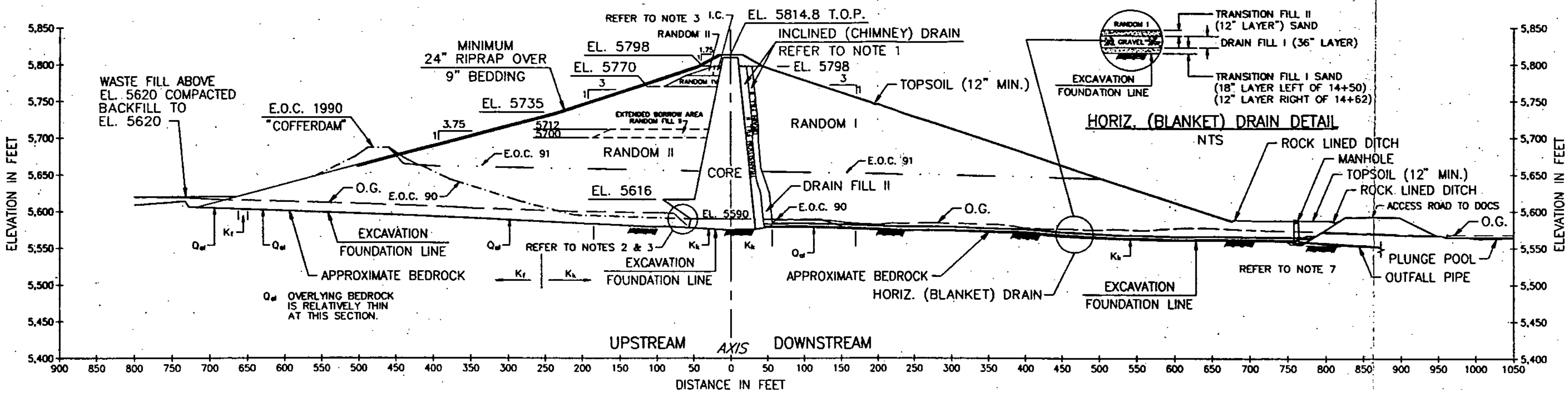
EMBANKMENT STAGES
PLANS AND PROFILES

DEPARTMENT OF THE ARMY
SACRAMENTO DISTRICT, CORPS OF ENGINEERS
SACRAMENTO, CALIFORNIA

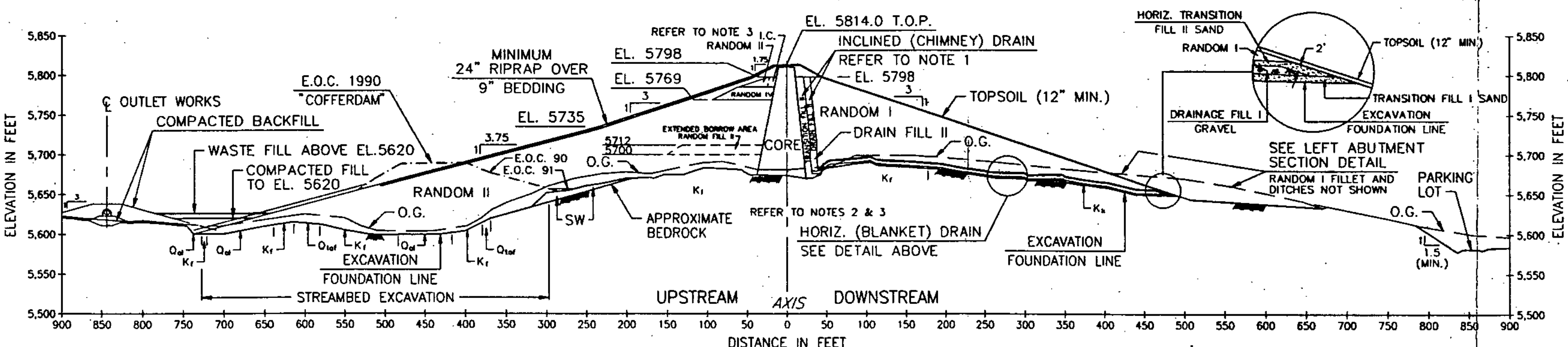
SUBMITTED: MICHAEL D. RAMSBOTHAM			APPROVED: RESIDENT ENGINEER
GEB	MDR	CEC	PLATE 3

1=400

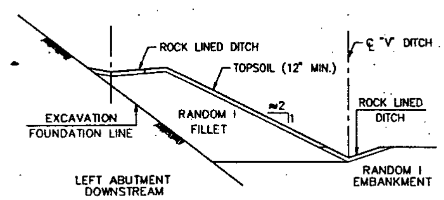

SCALE 1"=200'
CONTOUR INTERVAL 5'
DATE OF PHOTOGRAPHY SEPT. 9, 1993
200 100 0 200 400
LITTLE DELL LAKE
SALT LAKE CITY STREAMS, UTAH
ORTHO-TOPOGRAPHY
EMBANKMENT PLAN
DEPARTMENT OF THE ARMY
PLATE 4
TOE DRAIN CATCH BASIN
DRAIN-BLANKET DISCHARGE
PRINC. DRAIN-WEIR-1
EROSION CONTROL STRUCTURES
WASTE FILL 4 DRAINAGE
SPILLWAY TURN AROUND
5648.6
5725
5750
5775
5800
5850
5700
5675



STA. 14+50

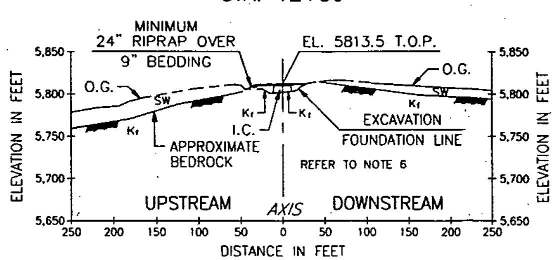


STA. 12+50



LEFT ABUTMENT SECTION DETAIL

LEFT ABUTMENT DOWNSTREAM
(TYPICAL BETWEEN STA. 13+50± TO STA. 16+25±)



STA. 10+50

LEGEND:

K_f	FRONTIER FORMATION
K_k	KELVIN FORMATION
Q_{al}	YOUNGER ALLUVIUM
Q_{ao}	OLDER ALLUVIUM
Q_{ofa}	FINE GRAINED, OLDER ALLUVIUM
Q_{oau}	UPPER GRAVEL, OLDER ALLUVIUM
Q_{oab}	BASAL GRAVEL, OLDER ALLUVIUM
O.G.	ORIGINAL GROUND LINE
OLS	OLD LANDSLIDE
SW	SLOPEWASH
T.O.P.	TOP OF PAVEMENT
E.O.C.	END OF CONSTRUCTION
— · — · —	END OF CONSTRUCTION 1990 (E.O.C. 90)
— · · — · · —	END OF CONSTRUCTION 1991 (E.O.C. 91)
	APPROXIMATE BEDROCK LINE

NOTES:

1. DRAINAGE FILL II AND TRANSITION FILL II ZONES ARE DRAWN AS 8' WIDTHS. ACTUAL ZONE WIDTHS STARTED AT 12' AND WERE REDUCED TO ABOUT 10' (±1'). DRAINAGE FILL II CAPPED WITH TRANSITION II SAND.
2. AT THE ABUTMENTS THE IMPERVIOUS CORE ZONE WAS WIDENED TO SIMPLIFY PLACEMENT. THE IMPERVIOUS CORE ZONE MAY BE AS MUCH AS 15 FT. TO 20 FT. WIDER AT THE ABUTMENT THAN SHOWN.
3. IMPERVIOUS CORE TO RANDOM II ZONE LINE LOCATION IS VERY APPROXIMATE AT THIS SECTION/ELEVATION. IMPERVIOUS CORE IS GENERALLY WIDER THAN SHOWN.
4. GEOLOGY ANNOTATIONS INDICATE ONLY WHAT WAS EXPOSED AT THE FOUNDATION ELEVATION.
5. DRAINAGE BLANKET LAYER DIMENSIONS ARE MINIMUM DESIGN THICKNESSES PERPENDICULAR TO THE SLOPE. DRAINAGE FILL I LAYER WAS CAPPED WITH TRANSITION FILL II SAND AT THE ABUTMENTS, EL. 5780 FT.
6. HORIZONTAL (BLANKET) DRAIN TERMINATED AT EL. 5780, ABOUT STA. 10+80 TO STA. 10+90. DRAINAGE FILL I WAS CAPPED WITH TRANSITION FILL II.
7. THE MANHOLE IS AT STA. 14+49.0, 759.4 FEET DOWNSTREAM OF THE DAM AXIS. THERE ARE TWO LATERAL TOE DRAINS 12" DIA., SCHED. 80, SLOTTED PVC PIPE. THE LEFT LATERAL DRAIN INVERT IS AT EL. 5557.2 FT. THE OUTFALL IS AN 18" DIA., SCHED. 80 PVC PIPE WITH AN INVERT AT EL. 5558.2 FT. THE OUTFALL PIPE DISCHARGES ABOVE THE PARSHALL FLUME. THE LEFT LATERAL DRAIN TERMINATES AT STA. 13+23.4, OFFSET −674.5 FT. ANE EL 5569.2 FT. THE RIGHT LATERAL DRAIN TERMINATES AT STA. 15+31.2, OFFSET −710.0 FT. AND EL. 5568. FT.

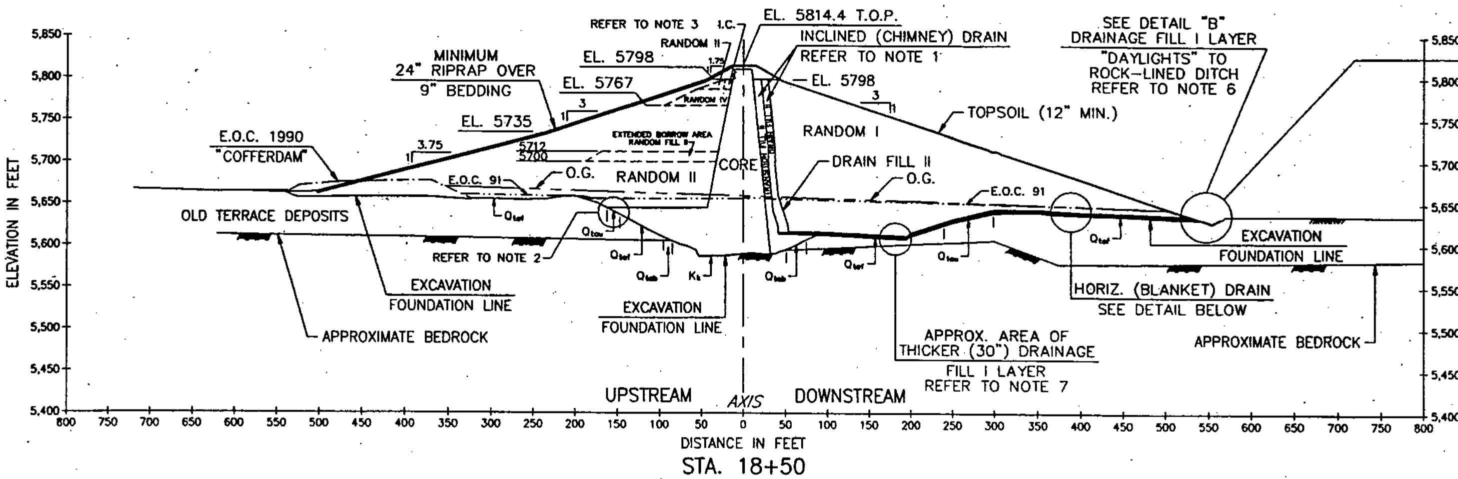
LITTLE DELL LAKE
SALT LAKE CITY STREAMS, UTAH

EMBANKMENT SECTIONS (AS-BUILT)
STATION 10+50, 12+50, 14+50

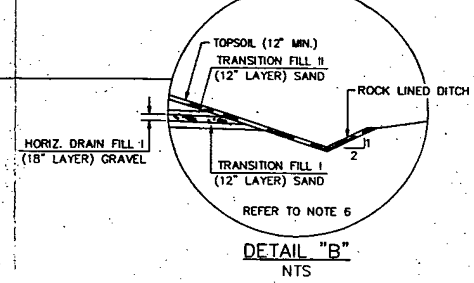
DEPARTMENT OF THE ARMY
SACRAMENTO DISTRICT, CORPS OF ENGINEERS
SACRAMENTO, CALIFORNIA

SUBMITTED:		APPROVED:
MICHAEL D. RAMSBOTHAM		RESIDENT ENGINEER
DR. BY: GEB	CHECKED BY: MDR	PLATE 5

1=150



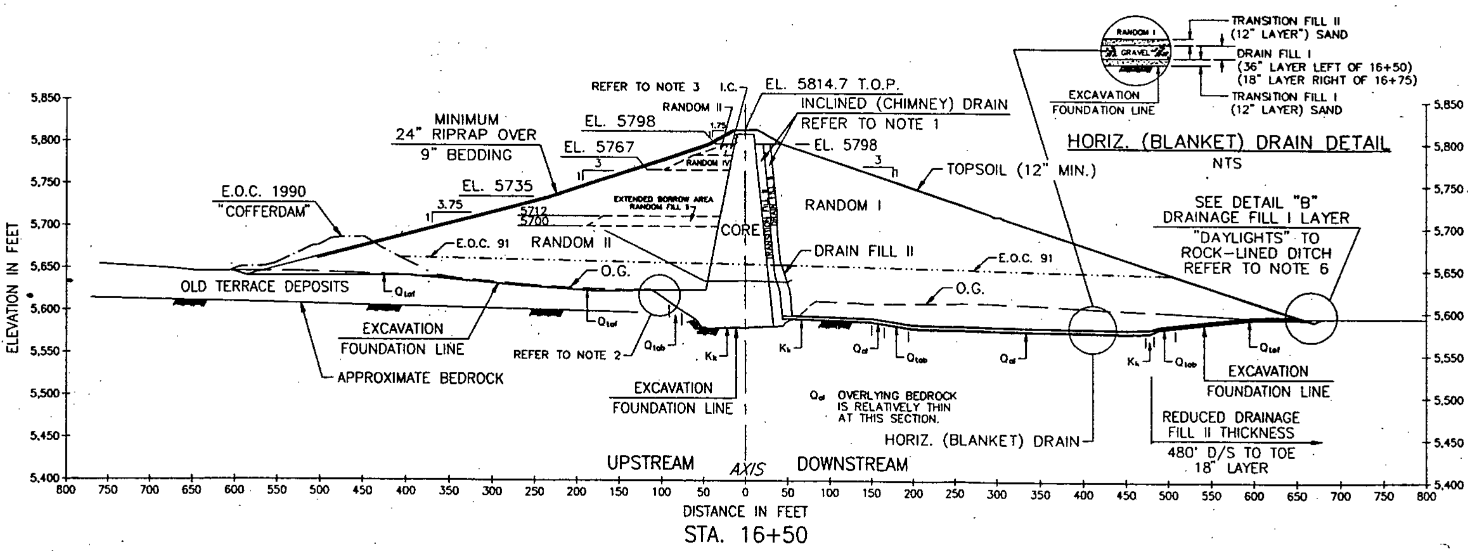
STA. 18+50



DETAIL "B"
NTS

LEGEND:

Kf	FRONTIER FORMATION
Kk	KELVIN FORMATION
Qal	YOUNGER ALLUVIUM
Qto	OLDER ALLUVIUM
Qtof	FINE GRAINED, OLDER ALLUVIUM
Qtou	UPPER GRAVEL, OLDER ALLUVIUM
Qtob	BASAL GRAVEL, OLDER ALLUVIUM
O.G.	ORIGINAL GROUND LINE
OLS	OLD LANDSLIDE
SW	SLOPEWASH
T.O.P.	TOP OF PAVEMENT
E.O.C.	END OF CONSTRUCTION
—·—·—	END OF CONSTRUCTION 1990 (E.O.C. 90)
—··—··—	END OF CONSTRUCTION 1991 (E.O.C. 91)
▬	APPROXIMATE BEDROCK LINE



STA. 16+50

NOTES:

1. DRAINAGE FILL II AND TRANSITION FILL II ZONES ARE DRAWN AS 8' WIDTHS. ACTUAL ZONE WIDTHS ARE ABOUT 10' (±1'). DRAINAGE FILL II CAPPED WITH TRANSITION II SAND.
2. AT THE ABUTMENTS THE IMPERVIOUS CORE ZONE WAS WIDENED TO SIMPLIFY PLACEMENT. THE IMPERVIOUS CORE ZONE MAY BE AS MUCH AS 15 FT. TO 20 FT. WIDER AT THE ABUTMENT THAN SHOWN.
3. IMPERVIOUS CORE TO RANDOM II ZONE LINE LOCATION IS VERY APPROXIMATE AT THIS SECTION/ELEVATION. IMPERVIOUS CORE IS GENERALLY WIDER THAN SHOWN.
4. GEOLOGY ANNOTATIONS INDICATE ONLY WHAT WAS EXPOSED AT THE FOUNDATION ELEVATION.
5. DRAINAGE BLANKET LAYER DIMENSIONS ARE MINIMUM DESIGN THICKNESSES PERPENDICULAR TO THE SLOPE. DRAINAGE FILL I LAYER WAS CAPPED WITH TRANSITION FILL II SAND AT THE ABUTMENTS, EL. 5780 FT.
6. DRAINAGE FILL I LAYER DAYLIGHTS TO THE ROCK LINED DITCH BETWEEN APPROXIMATELY STA. 16+35 TO STA. 24+00.
7. AREA OF THICKENED DRAINAGE FILL I LAYER EXTENDS FROM APPROXIMATELY STA. 16+75 TO STA. 20+75 IN THIS LOW AREA.

LITTLE DELL LAKE
SALT LAKE CITY STREAMS, UTAH

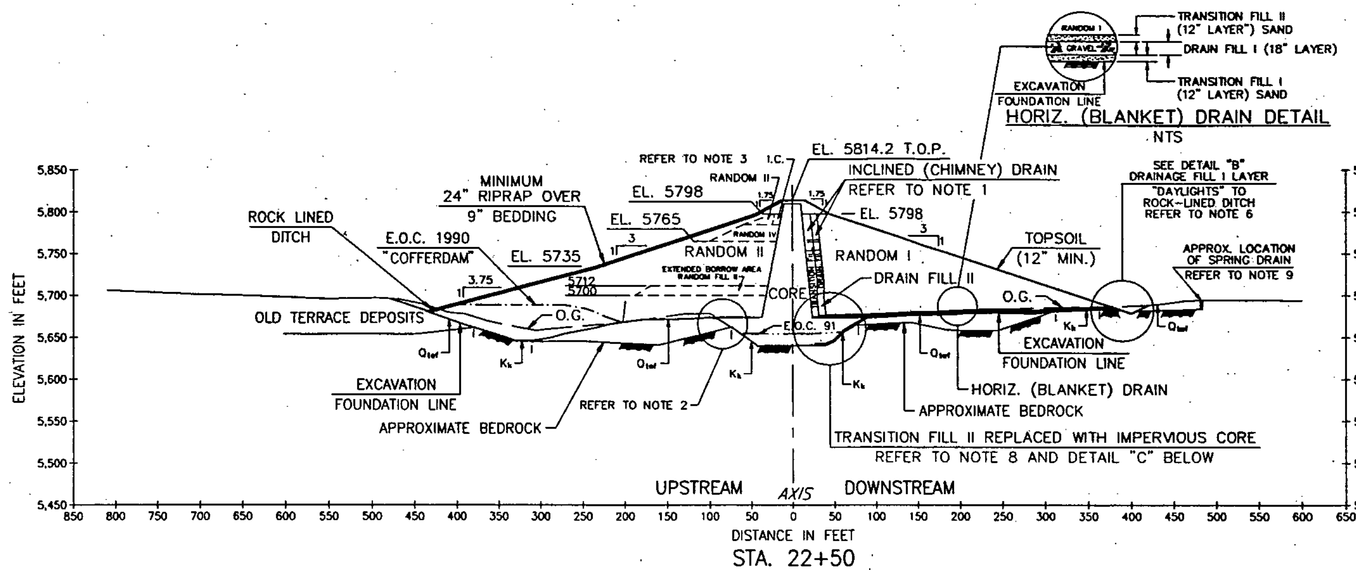
EMBANKMENT SECTIONS (AS-BUILT)
STA. 16+50 AND STA. 18+50

DEPARTMENT OF THE ARMY
SACRAMENTO DISTRICT, CORPS OF ENGINEERS
SACRAMENTO, CALIFORNIA

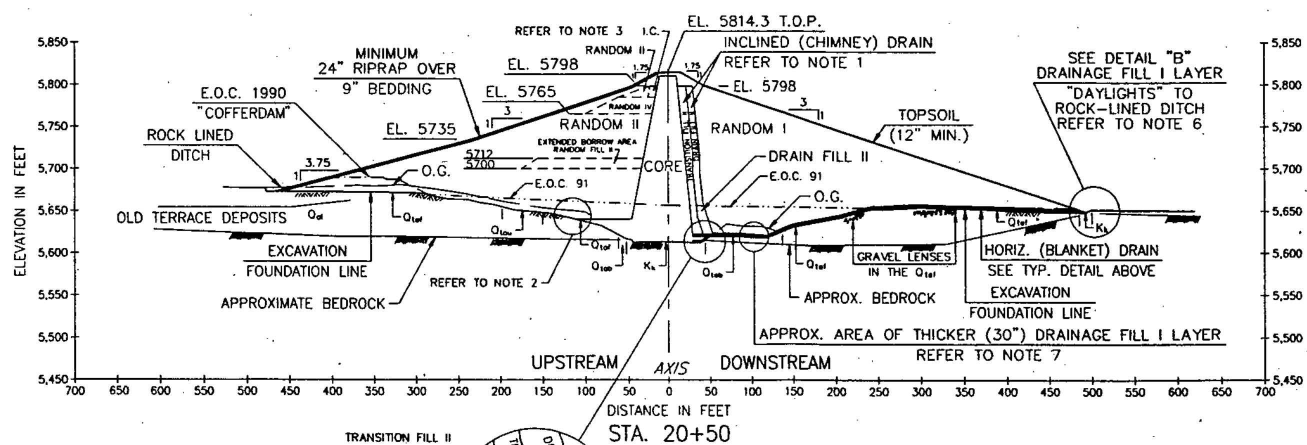
SUBMITTED: MICHAEL D. RAMSBOTHAM
APPROVED: John Cavugs [signature]
RESIDENT ENGINEER

DR. BY: GEB
CHECKED BY: MDR

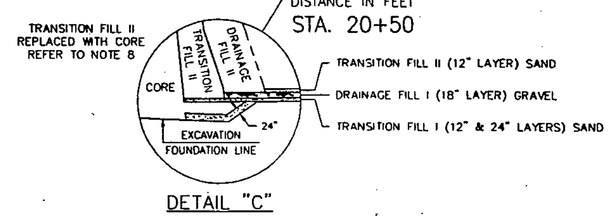
PLATE 6



STA. 22+50



STA. 20+50



DETAIL "C"
NTS

LEGEND:

K_f	FRONTIER FORMATION
K_k	KELVIN FORMATION
Q_{al}	YOUNGER ALLUVIUM
Q_{oa}	OLDER ALLUVIUM
Q_{tof}	FINE GRAINED, OLDER ALLUVIUM
Q_{tou}	UPPER GRAVEL, OLDER ALLUVIUM
Q_{tob}	BASAL GRAVEL, OLDER ALLUVIUM
O.G.	ORIGINAL GROUND LINE
OLS	OLD LANDSLIDE
SW	SLOPEWASH
T.O.P.	TOP OF PAVEMENT
E.O.C.	END OF CONSTRUCTION
—·—·—	END OF CONSTRUCTION 1990 (E.O.C. 90)
—··—··—	END OF CONSTRUCTION 1991 (E.O.C. 91)
	APPROXIMATE BEDROCK LINE

NOTES:

1. DRAINAGE FILL II AND TRANSITION FILL II ZONES ARE DRAWN AS 8' WIDTHS. ACTUAL ZONE WIDTHS ARE ABOUT 10' (±1'). DRAINAGE FILL II CAPPED WITH TRANSITION II SAND.
2. AT THE ABUTMENTS THE IMPERVIOUS CORE ZONE WAS WIDENED TO SIMPLIFY PLACEMENT. THE IMPERVIOUS CORE ZONE MAY BE AS MUCH AS 15 FT. TO 20 FT. WIDER AT THE ABUTMENT THAN SHOWN.
3. IMPERVIOUS CORE TO RANDOM II ZONE LINE LOCATION IS VERY APPROXIMATE AT THIS SECTION/ELEVATION. IMPERVIOUS CORE IS GENERALLY WIDER THAN SHOWN.
4. GEOLOGY ANNOTATIONS INDICATE ONLY WHAT WAS EXPOSED AT THE FOUNDATION ELEVATION.
5. DRAINAGE BLANKET LAYER DIMENSIONS ARE MINIMUM DESIGN THICKNESSES PERPENDICULAR TO THE SLOPE. DRAINAGE FILL I LAYER WAS CAPPED WITH TRANSITION FILL II SAND AT THE ABUTMENTS, EL. 5780 FT.
6. DRAINAGE FILL I LAYER DAYLIGHTS TO THE ROCK LINED DITCH BETWEEN APPROXIMATELY STA. 16+35 TO STA. 24+00.
7. AREA OF THICKENED DRAINAGE FILL I LAYER EXTENDS FROM APPROXIMATELY STA. 16+75 TO STA. 20+75 IN THIS LOW AREA.
8. BETWEEN APPROXIMATELY STA. 19+65 AND STA. 24+65 IMPERVIOUS CORE MATERIAL WAS SUBSTITUTED FOR TRANSITION II IN THIS AREA. A 24" THICK LAYER OF TRANSITION I WAS PLACED/EXTENDED TO THE THEORETICAL CORE LINE.
9. THE SPRING DRAIN INITIALLY CONSISTED OF A 6" DIAMETER SLOTTED PVC IN A GRAVEL FILLED TRENCH 10'± DEEP (MAX.). THE TRENCH IS LOCATED FROM 465 FT. TO 480 FT. DOWNSTREAM BETWEEN STA 24+00 AND STA. 21+50. FLOW IS MEASURED AT THE ORIGINAL SPRING DRAIN BETWEEN −515 FT. AND −532 FT. DOWNSTREAM AND STA. 22+81 AND 22+98. THE SUMP IS A PIT APPROXIMATELY 14' x 14' x 10' DEEP BACKFILLED WITH GRAVEL WITH A 4" DIAMETER PERFORATED COLLECTOR PIPE.

LITTLE DELL LAKE
SALT LAKE CITY STREAMS, UTAH

EMBANKMENT SECTIONS (AS-BUILT)
STA. 20+50 AND STA. 22+50

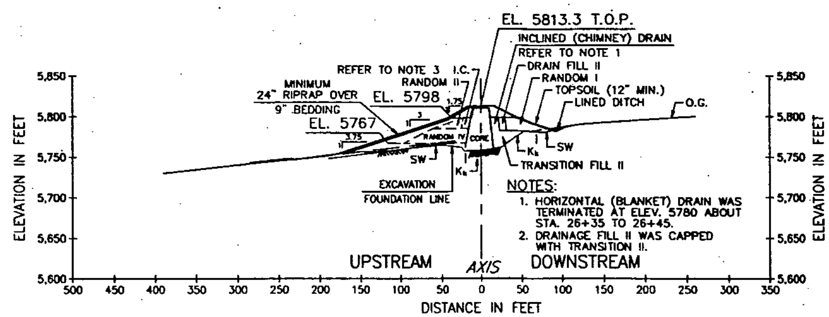
DEPARTMENT OF THE ARMY
SACRAMENTO DISTRICT, CORPS OF ENGINEERS
SACRAMENTO, CALIFORNIA

SUBMITTED: MICHAEL D. RAMSBOTHAM

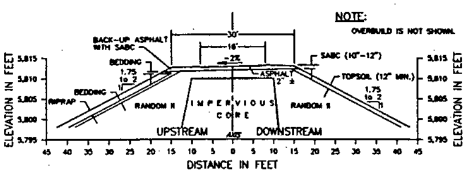
APPROVED: RESIDENT ENGINEER

CEB | MDR

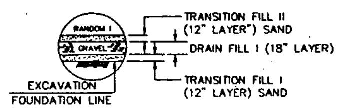
PLATE 7



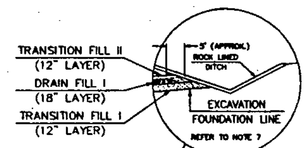
STA. 26+50



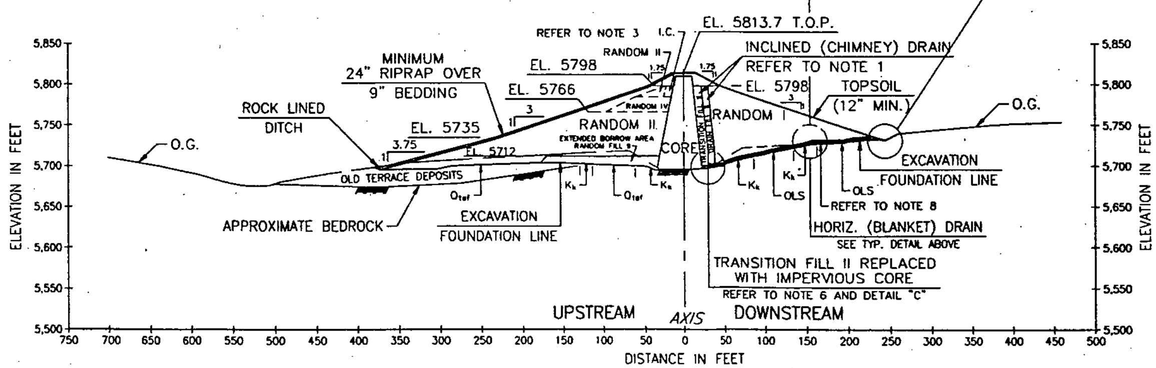
TOP OF DAM DETAIL
SCALE: 1" = 30'



HORIZ. (BLANKET) DRAIN DETAIL
NTS



ENCAPSULATED DRAINAGE FILL I DETAIL
NTS



STA. 24+50

LEGEND:

K_f	FRONTIER FORMATION
K_k	KELVIN FORMATION
Q_{al}	YOUNGER ALLUVIUM
Q_{oa}	OLDER ALLUVIUM
Q_{oaf}	FINE GRAINED, OLDER ALLUVIUM
Q_{oau}	UPPER GRAVEL, OLDER ALLUVIUM
Q_{oab}	BASAL GRAVEL, OLDER ALLUVIUM
O.G.	ORIGINAL GROUND LINE
OLS	OLD LANDSLIDE
SW	SLOPEWASH
T.O.P.	TOP OF PAVEMENT
E.O.C.	END OF CONSTRUCTION
—·—·—	END OF CONSTRUCTION 1990 (E.O.C. 90)
—··—··—	END OF CONSTRUCTION 1991 (E.O.C. 91)
▬	APPROXIMATE BEDROCK LINE

NOTES:

1. DRAINAGE FILL II AND TRANSITION FILL II ZONES ARE DRAWN AS 8' WIDTHS. ACTUAL ZONE WIDTHS ARE ABOUT 10' (±1'). DRAINAGE FILL II CAPPED WITH TRANSITION II SAND.
2. AT THE ABUTMENTS THE IMPERVIOUS CORE ZONE WAS WIDENED TO SIMPLIFY PLACEMENT. THE IMPERVIOUS CORE ZONE MAY BE AS MUCH AS 15 FT. TO 20 FT. WIDER AT THE ABUTMENT THAN SHOWN.
3. IMPERVIOUS CORE TO RANDOM II ZONE LINE LOCATION IS VERY APPROXIMATE AT THIS SECTION/ELEVATION. IMPERVIOUS CORE IS GENERALLY WIDER THAN SHOWN.
4. GEOLOGY ANNOTATIONS INDICATE ONLY WHAT WAS EXPOSED AT THE FOUNDATION ELEVATION.
5. DRAINAGE BLANKET LAYER DIMENSIONS ARE MINIMUM DESIGN THICKNESSES PERPENDICULAR TO THE SLOPE. DRAINAGE FILL I LAYER WAS CAPPED WITH TRANSITION FILL II SAND AT THE ABUTMENTS, EL. 5780 FT.
6. BETWEEN APPROXIMATELY STA. 19+65 AND STA. 24+65 IMPERVIOUS CORE MATERIAL WAS SUBSTITUTED FOR TRANSITION II IN THIS AREA. A 24" THICK LAYER OF TRANSITION I WAS PLACED/EXTENDED TO THE THEORETICAL CORE LINE.
7. DRAINAGE FILL I LAYER WAS ENCAPSULATED WITH TRANSITION SAND FROM ABOUT STA. 24+00 TO THE TOP OF THE BLANKET, ABOUT STA. 26+35.
8. THE OLD LANDSLIDE (OLS) FEATURE WAS ENCOUNTERED BETWEEN STA. 22+60 AND STA. 25+00.
9. THE HORIZONTAL (BLANKET) DRAIN WAS TERMINATED AT ELEVATION 5780 FT. ABOUT STA. 26+35 TO STA. 26+45. DRAINAGE FILL I WAS CAPPED WITH TRANSITION FILL II.

LITTLE DELL LAKE
SALT LAKE CITY STREAMS, UTAH

EMBANKMENT SECTIONS (AS-BUILT)
STATION 24+50 AND STATION 26+50

DEPARTMENT OF THE ARMY
SACRAMENTO DISTRICT, CORPS OF ENGINEERS
SACRAMENTO, CALIFORNIA

SUBMITTED: MICHAEL D. RAMSBOTHAM

APPROVED:

GEB | MDR

PLATE 8

DESCRIPTION OF MAP UNITS

(Isotopic ages have been recalculated from decay constants accepted by the U.S. Geological survey in 1984)

Qal Alluvium (Holocene)—Boulders to pebble gravel, sand, silt, and clay deposited in channels and flood plains of streams. Thickness as much as 3 m

Qf Alluvial-fan and debris-fan deposits (Holocene and Pleistocene)—Gravel, sand, and silt; locally bouldery. Crudely bedded to nonbedded and poorly sorted. Maximum thickness probably 10 m

Landslide deposits (Holocene and Pleistocene)—Poorly sorted; particle size ranges from clay to blocks, depending on material involved in sliding; include mudflow, debris-avalanche, and slump deposits

Qoa Old alluvium (Pleistocene)—Gravel, silty gravel, and sandy silt in dissected alluvial fans and alluvium. Includes local marsh deposits. Much of the units in the valley near Keetley is more than 730,000 years old (Sullivan and Nelson, 1983). In Salt Lake valley, upper Pleistocene alluvial deposits merge with regressive-phase deposits of Lake Bonneville. More than 100 m thick in valley near Keetley; 2–7 m thick in Salt Lake valley

Deposits of regressive phase of Lake Bonneville (Pleistocene)

Qps Sand and gravel deposits—Sandy gravel, gravely sand, and silty gravel. Includes deposits attributed by Miller (1980) to Stansbury lake stand. Thickness 1–4 m

Deposits of the high stand of Lake Bonneville (Pleistocene)

Silt and clay deposits—Sandy, clayey silt, sand, or silty clay. Massive to thinly bedded. Thickness as much as 8 m

Sand and gravel deposits—Sand, silty sand, sandy pebble and cobble gravel, and gravelly sand. Thickness 1–30 m

Qtp Till of Pinedale age (Pleistocene)—Poorly sorted bouldery till that forms prominent moraines. As mapped, may include some colluvium, talus, and landslide debris. A few meters thick except in moraines where maximum thickness is 180 m

Qaf Older alluvial-fan and debris-fan deposits (Pleistocene)—Poorly sorted gravel, sand, and silt; locally bouldery. Crudely bedded to nonbedded. Occur above present drainage and are inactive. Maximum thickness about 10 m

Gravel (Pleistocene or Pliocene)—Unconsolidated pebble, cobble, and boulder gravel on Porcupine Ridge and adjacent areas near northeast corner of quadrangle. Apparently gravel is a lag concentrate from underlying conglomerate (unit Toc). Also mapped on Slader Ridge in east-central part of quandrangle. Maximum thickness possibly a few tens of meters

Hooper Canyon Formation (Pliocene?)—Boulders, cobbles, and pebbles in a matrix of sand and silt. Coarse clasts are predominantly subrounded to subangular limestone and quartzite. Caps ridges north of City Creek and lies on erosion surface cut on deformed conglomerate (Tc). Maximum thickness 15 m

Conglomerate (Miocene?)—Pale-brown and light- to medium-gray, well- to poorly cemented, pebble and cobble conglomerate and sandstone. Generally contains coarse, subrounded to subangular clasts of limestone and quartzite, but near Mill Creek southeast of Bountiful, clasts of metamorphic rocks from the Farmington Canyon Complex are numerous. Thickness greater than 500 m

Light-gray to gray lahar, flow breccia, and tuff—Proportion of tuff increases with distance from volcanic centers. Sandstone and conglomerate composed of volcanic clasts occur distal to volcanic centers. Zircon fission-track age of 35.3 Ma and biotite K-Ar age of 37.5 Ma obtained from flow breccia north of Salt Lake City (Van Horn, 1981). Thickness as much as 500 m in Keetley region

Conglomerate (Oligocene and Eocene?)—Boulder, cobble, and pebble conglomerate containing fragments of sandstone derived from Mesozoic and upper Paleozoic formations; clasts of Nugget Sandstone (Unit JTn) are conspicuous. Contains a few lahars and beds of tuff and volcanic gravel. Locally rich in clasts of volcanic rock in Porcupine Ridge area in northeastern part of quadrangle. In the adjoining Ogden 30'x60' quadrangle to the north, unit is mapped as basal member of Norwood Tuff. Maximum thickness about 300 m

Wasatch Formation (Eocene and Paleocene)—Moderate-red, grayish-red, pale-red, reddish-brown, and gray sandstone, conglomerate, siltstone, and claystone; contains scattered, thin, lenticular beds of light-purplish-gray to light-gray, nonmarine limestone. Conglomerate clasts range from pebble to boulder size and have a varied lithology from diverse sources. Maximum stratigraphic thickness about 1,500 m in the Mountain Dell-Porterville area on the east side of the Wasatch Range and about 1,200 m north of the Uinta Mountains. In Chalk Creek area, yellowish-gray-weathering conglomerate forms a basal unit as much as 100 m thick overlain by a sequence of variegated sandstone and siltstone. This sandstone and siltstone is overlain by or interfingers with coarse conglomerate to the south, which was derived from Paleozoic and Precambrian rocks of the Uinta uplift. Polynomorphs indicate the lower 200–300 m is of late Paleocene age (Lamerson, 1982; Nichols, 1982; and this report)

Conglomerate dominant

Frontier Formation (Upper Cretaceous)

Upper member—Light-yellowish-gray marine sandstone, gray marine shale, gray to brown siltstone and silty shale, and coal. Conglomerate, which occurs at the base of the unit as a bed 6–30 m thick in the Coalville area, contains rounded pebbles and cobbles of sandstone and limestone. Conglomeratic beds are numerous along the Weber River valley at Franklin Canyon. In Coalville area units contain middle Coniacian fauna 330 m above base and at top (Ryer, 1976). Thickness 800–1,100 m in Coalville area. Thickness 1,600 m in East Canyon Creek area

Oyster Ridge Sandstone Member—Light-yellow to gray marine sandstone and pebbly sandstone locally overlain by nonmarine sandstone, siltstone, and silty shale. Contains early middle Turonian ammonite, Collignoniceras woolgari (Cobban and Reeside, 1952). Thickness 60–100 m

Lower member—Light- to dark-gray marine shale, sandstone, conglomeratic sandstone, and silty shale; coal; and gray, light-red, grayish-red, and green claystone. Contains earliest Turonian fossils about 1,000 m above base and early middle Turonian fossils in the upper 240 m in Coalville area (Ryer, 1976). Thickness 1,370 m in Coalville area and about 1,800 m along East Canyon Creek

Conglomerate facies—Conglomerate containing interbeds of sandstone and, rarely, of red and gray clay. Conglomerate contains rounded pebbles and cobbles of sandstone and limestone from the Mesozoic and upper Paleozoic section. Locally contains boulders as much as 1 m in diameter. Three tongues of conglomerate in East Canyon Creek area merge to the west into a body 1,300 m thick

Kelvin Formation (Lower Cretaceous)

Upper member—Yellowish-gray, grayish-red, and light- to moderate-red sandstone; gray, reddish-brown, and grayish-red siltstone and claystone; and conglomerate. Conglomerate beds thicker and more numerous west of East Canyon Creek; contains pebbles and cobbles of sandstone, siltstone, and minor amounts of limestone. Unit about 1,300 m thick in Turner Hollow area; thins to west and south. About 470 m thick near head of Parleys Canyon

Parleys Member—Light- to pale-gray limestone associated with pale-lavender-gray siltstone containing limestone nodules; reddish-brown siltstone, pale-brown to pale-reddish-brown sandstone, and conglomerate. About 50 m thick

Preuss Sandstone (Middle Jurassic)—Reddish-brown, grayish-red, and light- to moderate-red silty sandstone, sandstone, and silty shale. Contains anhydrite and salt in the subsurface in the Chalk Creek area and east of Franklin Canyon (Lamerson, 1982). About 300 m thick, but locally has been thickened due to deformation and flowage of salt, anhydrite, and associated shales

Twin Creek Limestone (Middle Jurassic)—Thin- to medium-bedded, gray, light-gray, and purplish-gray limestone and some beds of grayish-red to brown siltstone and sandstone. Locally fossiliferous. Thickness ranges from 850 m near Parleys Canyon to 400 m near Peoa

Nugget Sandstone (Jurassic? and Triassic?)—Pale-greyish-orange, fine-grained sandstone, and white quartz sandstone. Crossbedded in upper part, planar bedded in lower part. Thickness ranges from 400 m in Parleys Canyon to 380 m near Peoa

Ankareh Formation

Upper member (Upper Triassic)—Moderate-red, grayish-red, and grayish-purple mudstone and fine-grained sandstone. Thickness about 210 m in Wasatch Range and 110 m in western Uinta Mountains

Garta Member (Upper Triassic)—White to pale-purple, massive, crossbedded, coarse-grained to pebbly quartzite. Thickness as much as 70 m in Wasatch Range and 20–30 m in Uinta Mountains

Mahogany Member (Lower Triassic)—Purplish-gray and pale-red sandstone, mudstone, and a few thin limestone beds. Thickness ranges from 260 m in Wasatch Range to 225 m on northwest flank of Uinta Mountains

Thaynes Limestone (Lower Triassic)—Light-gray, thin- to thick-bedded limestone and brownish-gray siltstone containing beds of light-gray sandstone, pale-red silty limestone, light-gray shaly limestone, and dark-greenish-gray siltstone and shale. Locally contains pelecypods, gastropods, and ammonites. Thickness ranges from 600 m north of Red Butte Creek to 215 m on northwest flank o Uinta Mountains

Woodside Formation (Lower Triassic)—Grayish-red, grayish-purple, reddish-brown, and moderate-red shale, siltstone, and fine-grained sandstone; thin white limestone beds; and grayish-red siltstone. Locally, a few tens of meters of green or greenish-gray shale and siltstone at the base. Thickness ranges from 120 m north of Red Butte Creek east of Salt Lake City to 300 m near Park City

Park City Formation and related rocks (Permian)—Fossiliferous and cherty, gray to pinkish-gray limestone, calcareous siltstone, and cherty sandstone; near middle of unit is a dark-gray, phosphatic shale which is about 30 m thick (Meade Peak Phosphatic Shale Member of Phosphoria Formation). Thickness ranges from 200 m at Mill Creek southeast of Salt Lake City to 600 m at South Fork Dry Creek northeast of Salt Lake City

Weber Sandstone (Pennsylvanian) — Pale-yellowish-gray to white, crossbedded, quartzitic and calcareous sandstone containing a few beds of light-gray to white limestone and dolomite. Thickness generally 300–500 m, but ranges from 150 to 750 m south of City Creek Canyon, where thinned by bedding faults and thickened by folding or fault repetition, and 600 m east of head of American Fork Canyon along the south-central edge of the quadrangle. Unit is Middle Pennsylvanian in Wasatch Range (Von Horn and Crittenden, 1988), but in Uinta Mountains upper part may be younger

Round Valley Limestone (Lower Pennsylvanian)—Light-gray-weathering, gray to dark-gray, fossiliferous limestone containing gray and reddish-gray chert and interbeds of gray and light-green shale and siltstone, grayish-red silty shale, and sandstone and sandy limestone. Pale-reddish-orange silicified fossils are characteristic. Thickness ranges from 300 m in Wasatch Range in City Creek area to 60 m on eastern edge of quadrangle

Doughnut Formation (Upper Mississippian)—Medium-gray, thinbedded limestone containing pods of dark-gray to black chert and abundant fossils; a 10–30-m-thick zone of black, greenish, or locally reddish shale at the base contains thin beds of greenish-gray to rusty-weathering, silty limestone. Black shale containing thin beds of dark-gray limestone and rusty-weathering sandstone occurs in Uinta Mountains. Thickness about 130 m in Wasatch Range and 65 m in Uinta Mountains

Great Blue Formation (Upper Mississippian)—Pale-gray, thickbedded, fine-grained limestone. Identified only in a fault slice near Black Mountain northeast of Salt Lake City. Thickness 100 m

Humburg Formation (Upper Mississippian)—Medium- to dark-gray limestone, dolomite, and limestone breccia containing beds of reddish-brown- to yellowish-gray-brown-weathering sandstone and rare interbeds of red siltstone. Thickness 120–280 m

Deseret Limestone (Upper and Lower Mississippian)—Thick-bedded dolomite and limestone locally containing abundant lenses and pods of dark-gray chert. A 10–12 m-thick zone of black phosphatic shale and thin-bedded limestone at base. Occurs only in Wasatch Range. Thickness 140–295 m

Gardison Limestone(Lower Mississippian)—Medium- to dark-gray, thin- to thick-bedded, fossiliferous limestone. Occurs only in Wasatch Range. Thickness about 200 m

Pinyon Peak Limestone (Upper Devonian)—Pale-tan to pale-gray, thin-bedded, nodular limestone containing interbeds of gray shale. Occurs only north and northeast of Salt Lake City. Thickness 50–60 m

Stansbury Formation (Upper Devonian)—Pale-gray to yellowish-gray, coarse-grained, crossbedded sandstone and calcareous siltstone; yellowish-weathering silty limestone; and grayish-red to bright-red shale. Basal part contains pale-gray to white, laminated dolomite; dark-gray, coarse-grained dolomite; and a quartzite bed 1 m thick at the base. Occurs only north and northeast of Salt Lake City. Thickness about 150 m

Maxfield Limestone (Middle Cambrian)—Contains upper member of dark-gray, medium-bedded, oolitic dolomite; middle member of mottled dolomite, limestone, and nodular shale; and lower member of massive, dark-gray, mottled dolomite and limestone having yellowish-gray silty laminae. Occurs only in Wasatch Range. Thickness is 360 m north of City Creek

Ophir Formation (Middle Cambrian)—Contains upper member of blocky-weathering, calcareous sandstone; middle member of thin-bedded limestone having yellowish-grey silty laminae; and lower member of olive-gray, micaceous shale. Thickness is 125 m in Big and Little Cottonwood Canyons area. North of City Creek, members are not distinguishable and thickness is only 57 m

Tintic Quartzite (Middle and Lower Cambrian)—Medium- to thick-bedded, fine- to coarse-grained, white, pale-yellowish-gray, and pale-reddish-brown quartzite; conglomeratic beds in lower 100 m. Thickness 250–600 m in Wasatch Range. Discontinuous lenses of unit as much as 100 m thick locally are preserved below pre-Late Devonian unconformity around Uinta Mountains

Schist and gneiss (Archean)—Biotite-feldspar-quartz gneiss, garnet-biotite-feldspar-quartz gneiss, sillimanite-biotite schist, sillimanite-garnet-biotite schist and gneiss, hornblende-biotite schist, and less abundant layers of white, coarse-grained quartzite; lenses and layers of amphibolite. Pegmatite dikes and sills; pegmatites with sharp contacts tend to be discordant and to cut those with indistinct contacts. Discordant pegmatites with sharp contacts are generally 10–30 m long, but a few are several hundred meters long

Schist, gneiss, and quartzite (Archean)—Includes biotite-feldspar-quartz schist, sillimanite-biotite schist, sillimanite-garnet-biotite schist and gneiss, and interlayered, coarse-grained, white to pale-yellowish-green quartzite in beds as much as 10 m thick. Quartzite dominates much of the unit, has a grain size of 4–5 mm; contains some light-green muscovite and a few heavy mineral partings. Contact with units Afs is gradational

LEGEND:

Contact

Fault—Dashed where approximate or inferred; dotted where concealed. Many faults have a complex history; only the sense of most recent movement shown on map. Relative movement shown on cross section by arrow; double-headed arrow indicates opposite movement sense at different times. A, away from observer, T, toward observe

High-angle—Bar and ball on downthrown side

Thrust—Sawteeth on upper plate

Folds—Arrow shows direction of plunge where known. Dashed where approximate or inferred; dotted where concealed

Anticline

Overturned anticline

Syncline

Overturned syncline

30 Strike and dip of bedding
Inclined

60 Overturned

Vertical

40 Strike and dip of foliation and compositional layering where parallel
Inclined

60 Strike and dip of foliation
Inclined

REFERENCE

Geologic map of the Salt Lake City 30' x 60' quadrangle, North-Central Utah, and Uinta County, Wyoming. . .
by Bruce Bryant 1990

Palynologic data from Cretaceous and lower Tertiary rocks in the Salt Lake City 30' x 60' quadrangle. . .
by D. J. Nichols and Bruce Bryant

LITTLE DELL LAKE
SALT LAKE CITY STREAMS, UTAH

MAIN DAM

REGIONAL GEOLOGY
DESCRIPTION OF MAP UNITS

DEPARTMENT OF THE ARMY
SACRAMENTO DISTRICT, CORPS OF ENGINEERS
SACRAMENTO, CALIFORNIA

SUBMITTED: CARL E. COLE, RESIDENT GEOLOGIST

APPROVED: RESIDENT ENGINEER

ERE | | RAB | PLATE 9

DESCRIPTION OF MAP UNITS

(Isotopic ages have been recalculated from decay constants accepted by the U.S. Geological survey in 1984)

Qal — Alluvium (Holocene)—Boulders to pebble gravel, sand, silt, and clay deposited in channels and flood plains of streams. Thickness as much as 3 m

Qf — Alluvial-fan and debris-fan deposits (Holocene and Pleistocene)—Gravel, sand, and silt; locally bouldery. Crudely bedded to nonbedded and poorly sorted. Maximum thickness probably 10 m

Landslide deposits (Holocene and Pleistocene)—Poorly sorted; particle size ranges from clay to blocks, depending on material involved in sliding; include mudflow, debris-avalanche, and slump deposits

Qoa — Old alluvium (Pleistocene)—Gravel, silty gravel, and sandy silt in dissected alluvial fans and alluvium. Includes local marsh deposits. Much of the units in the valley near Keetley is more than 730,000 years old (Sullivan and Nelson, 1983). In Salt Lake valley, upper Pleistocene alluvial deposits merge with regressive-phase deposits of Lake Bonneville. More than 100 m thick in valley near Keetley; 2–7 m thick in Salt Lake valley

Deposits of regressive phase of Lake Bonneville (Pleistocene)

Qpg — Sand and gravel deposits—Sandy gravel, gravely sand, and silty gravel. Includes deposits attributed by Miller (1980) to Stansbury lake stand. Thickness 1–4 m

Deposits of the high stand of Lake Bonneville (Pleistocene)

Silt and clay deposits—Sandy, clayey silt, sand, or silty clay. Massive to thinly bedded. Thickness as much as 8 m

Sand and gravel deposits—Sand, silty sand, sandy pebble and cobble gravel, and gravelly sand. Thickness 1–30 m

Qtp — Till of Pinedale age (Pleistocene)—Poorly sorted bouldery till that forms prominent moraines. As mapped, may include some colluvium, talus, and landslide debris. A few meters thick except in moraines where maximum thickness is 180 m

Older alluvial-fan and debris-fan deposits (Pleistocene)—Poorly sorted gravel, sand, and silt; locally bouldery. Crudely bedded to nonbedded. Occur above present drainage and are inactive. Maximum thickness about 10 m

Gravel (Pleistocene or Pliocene)—Unconsolidated pebble, cobble, and boulder gravel on Porcupine Ridge and adjacent areas near northeast corner of quadrangle. Apparently gravel is a lag concentrate from underlying conglomerate (unit Toc). Also mapped on Slader Ridge in east-central part of quandrangle. Maximum thickness possibly a few tens of meters

Hooper Canyon Formation (Pliocene?)—Boulders, cobbles, and pebbles in a matrix of sand and silt. Coarse clasts are predominantly subrounded to subangular limestone and quartzite. Caps ridges north of City Creek and lies on erosion surface cut on deformed conglomerate (Tc). Maximum thickness 15 m

Conglomerate (Miocene?)—Pale-brown and light- to medium-gray, well- to poorly cemented, pebble and cobble conglomerate and sandstone. Generally contains coarse, subrounded to subangular clasts of limestone and quartzite, but near Mill Creek southeast of Bountiful, clasts of metamorphic rocks from the Farmington Canyon Complex are numerous. Thickness greater than 500 m

Light-gray to gray lahar, flow breccia, and tuff—Proportion of tuff increases with distance from volcanic centers. Sandstone and conglomerate composed of volcanic clasts occur distal to volcanic centers. Zircon fission-track age of 35.3 Ma and biotite K-Ar age of 37.5 Ma obtained from flow breccia north of Salt Lake City (Van Horn, 1981). Thickness as much as 500 m in Keetley region

Conglomerate (Oligocene and Eocene?)—Boulder, cobble, and pebble conglomerate containing fragments of sandstone derived from Mesozoic and upper Paleozoic formations; clasts of Nugget Sandstone (Unit J̄n) are conspicuous. Contains a few lahars and beds of tuff and volcanic gravel. Locally rich in clasts of volcanic rock in Porcupine Ridge area in northeastern part of quadrangle. In the adjoining Ogden 30'x60' quadrangle to the north, unit is mapped as basal member of Norwood Tuff. Maximum thickness about 300 m

Wasatch Formation (Eocene and Paleocene)—Moderate-red, grayish-red, pale-red, reddish-brown, and gray sandstone, conglomerate, siltstone, and claystone; contains scattered, thin, lenticular beds of light-purplish-gray to light-gray, nonmarine limestone. Conglomerate clasts range from pebble to boulder size and have a varied lithology from diverse sources. Maximum stratigraphic thickness about 1,500 m in the Mountain Dell-Porterville area on the east side of the Wasatch Range and about 1,200 m north of the Uinta Mountains. In Chalk Creek area, yellowish-gray-weathering conglomerate forms a basal unit as much as 100 m thick overlain by a sequence of variegated sandstone and siltstone. This sandstone and siltstone is overlain by or interfingers with coarse conglomerate to the south, which was derived from Paleozoic and Precambrian rocks of the Uinta uplift. Polynomorphs indicate the lower 200–300 m is of late Paleocene age (Lamerson, 1982; Nichols, 1982; and this report)

Conglomerate dominant

Frontier Formation (Upper Cretaceous)

Upper member—Light-yellowish-gray marine sandstone, gray marine shale, gray to brown siltstone and silty shale, and coal. Conglomerate, which occurs at the base of the unit as a bed 6–30 m thick in the Coalville area, contains rounded pebbles and cobbles of sandstone and limestone. Conglomeratic beds are numerous along the Weber River valley at Franklin Canyon. In Coalville area units contain middle Coniacian fauna 330 m above base and at top (Ryer, 1976). Thickness 800–1,100 m in Coalville area. Thickness 1,600 m in East Canyon Creek area

Oyster Ridge Sandstone Member—Light-yellow to gray marine sandstone and pebbly sandstone locally overlain by nonmarine sandstone, siltstone, and silty shale. Contains early middle Turonian ammonite, Collignoniceras woolgari (Cobban and Reeside, 1952). Thickness 60–100 m

Lower member—Light- to dark-gray marine shale, sandstone, conglomeratic sandstone, and silty shale; coal; and gray, light-red, grayish-red, and green claystone. Contains earliest Turonian fossils about 1,000 m above base and early middle Turonian fossils in the upper 240 m in Coalville area (Ryer, 1976). Thickness 1,370 m in Coalville area and about 1,800 m along East Canyon Creek

Conglomerate facies—Conglomerate containing interbeds of sandstone and, rarely, of red and gray clay. Conglomerate contains rounded pebbles and cobbles of sandstone and limestone from the Mesozoic and upper Paleozoic section. Locally contains boulders as much as 1 m in diameter. Three tongues of conglomerate in East Canyon Creek area merge to the west into a body 1,300 m thick

Kelvin Formation (Lower Cretaceous)

Upper member—Yellowish-gray, grayish-red, and light- to moderate-red sandstone; gray, reddish-brown, and grayish-red siltstone and claystone; and conglomerate. Conglomerate beds thicker and more numerous west of East Canyon Creek; contains pebbles and cobbles of sandstone, siltstone, and minor amounts of limestone. Unit about 1,300 m thick in Turner Hollow area; thins to west and south. About 470 m thick near head of Parleys Canyon

Parleys Member—Light- to pale-gray limestone associated with pale-lavender-gray siltstone containing limestone nodules; reddish-brown siltstone, pale-brown to pale-reddish-brown sandstone, and conglomerate. About 50 m thick

Preuss Sandstone (Middle Jurassic)—Reddish-brown, grayish-red, and light- to moderate-red silty sandstone, sandstone, and silty shale. Contains anhydrite and salt in the subsurface in the Chalk Creek area and east of Franklin Canyon (Lamerson, 1982). About 300 m thick, but locally has been thickened due to deformation and flowage of salt, anhydrite, and associated shales

Twin Creek Limestone (Middle Jurassic)—Thin- to medium-bedded, gray, light-gray, and purplish-gray limestone and some beds of grayish-red to brown siltstone and sandstone. Locally fossiliferous. Thickness ranges from 850 m near Parleys Canyon to 400 m near Peoa

Nugget Sandstone (Jurassic? and Triassic?)—Pale-greyish-orange, fine-grained sandstone, and white quartz sandstone. Crossbedded in upper part, planar bedded in lower part. Thickness ranges from 400 m in Parleys Canyon to 380 m near Peoa

Ankareh Formation

Upper member (Upper Triassic)—Moderate-red, grayish-red, and grayish-purple mudstone and fine-grained sandstone. Thickness about 210 m in Wasatch Range and 110 m in western Uinta Mountains

Garta Member (Upper Triassic)—White to pale-purple, massive, crossbedded, coarse-grained to pebbly quartzite. Thickness as much as 70 m in Wasatch Range and 20–30 m in Uinta Mountains

Mahogany Member (Lower Triassic)—Purplish-gray and pale-red sandstone, mudstone, and a few thin limestone beds. Thickness ranges from 260 m in Wasatch Range to 225 m on northwest flank of Uinta Mountains

Thaynes Limestone (Lower Triassic)—Light-gray, thin- to thick-bedded limestone and brownish-gray siltstone containing beds of light-gray sandstone, pale-red silty limestone, light-gray shaly limestone, and dark-greenish-gray siltstone and shale. Locally contains pelecypods, gastropods, and ammonites. Thickness ranges from 600 m north of Red Butte Creek to 215 m on northwest flank o Uinta Mountains

Woodside Formation (Lower Triassic)—Grayish-red, grayish-purple, reddish-brown, and moderate-red shale, siltstone, and fine-grained sandstone; thin white limestone beds; and grayish-red siltstone. Locally, a few tens of meters of green or greenish-gray shale and siltstone at the base. Thickness ranges from 120 m north of Red Butte Creek east of Salt Lake City to 300 m near Park City

Park City Formation and related rocks (Permian)—Fossiliferous and cherty, gray to pinkish-gray limestone, calcareous siltstone, and cherty sandstone; near middle of unit is a dark-gray, phosphatic shale which is about 30 m thick (Meade Peak Phosphatic Shale Member of Phosphoria Formation). Thickness ranges from 200 m at Mill Creek southeast of Salt Lake City to 600 m at South Fork Dry Creek northeast of Salt Lake City

Weber Sandstone (Pennsylvanian)— Pale-yellowish-gray to white, crossbedded, quartzitic and calcareous sandstone containing a few beds of light-gray to white limestone and dolomite. Thickness generally 300–500 m, but ranges from 150 to 750 m south of City Creek Canyon, where thinned by bedding faults and thickened by folding or fault repetition, and 600 m east of head of American Fork Canyon along the south-central edge of the quadrangle. Unit is Middle Pennsylvanian in Wasatch Range (Van Horn and Crittenden, 1988), but in Uinta Mountains upper part may be younger

Round Valley Limestone (Lower Pennsylvanian)—Light-gray-weathering, gray to dark-gray, fossiliferous limestone containing gray and reddish-gray chert and interbeds of gray and light-green shale and siltstone, grayish-red silty shale, and sandstone and sandy limestone. Pale-reddish-orange silicified fossils are characteristic. Thickness ranges from 300 m in Wasatch Range in City Creek area to 60 m on eastern edge of quadrangle

Doughnut Formation (Upper Mississippian)—Medium-gray, thinbedded limestone containing pods of dark-gray to black chert and abundant fossils; a 10–30-m-thick zone of black, greenish, or locally reddish shale at the base contains thin beds of greenish-gray to rusty-weathering, silty limestone. Black shale containing thin beds of dark-gray limestone and rusty-weathering sandstone occurs in Uinta Mountains. Thickness about 130 m in Wasatch Range and 65 m in Uinta Mountains

Great Blue Formation (Upper Mississippian)—Pale-gray, thickbedded, fine-grained limestone. Identified only in a fault slice near Black Mountain northeast of Salt Lake City. Thickness 100 m

Humburg Formation (Upper Mississippian)—Medium- to dark-gray limestone, dolomite, and limestone breccia containing beds of reddish-brown- to yellowish-gray-brown-weathering sandstone and rare interbeds of red siltstone. Thickness 120–280 m

Deseret Limestone (Upper and Lower Mississippian)—Thick-bedded dolomite and limestone locally containing abundant lenses and pods of dark-gray chert. A 10–12 m-thick zone of black phosphatic shale and thin-bedded limestone at base. Occurs only in Wasatch Range. Thickness 140–295 m

Gardison Limestone(Lower Mississippian)—Medium- to dark-gray, thin- to thick-bedded, fossiliferous limestone. Occurs only in Wasatch Range. Thickness about 200 m

Pinyon Peak Limestone (Upper Devonian)—Pale-tan to pale-gray, thin-bedded, nodular limestone containing interbeds of gray shale. Occurs only north and northeast of Salt Lake City. Thickness 50–80 m

Stansbury Formation (Upper Devonian)—Pale-gray to yellowish-gray, coarse-grained, crossbedded sandstone and calcareous siltstone; yellowish-weathering silty limestone; and grayish-red to bright-red shale. Basal part contains pale-gray to white, laminated dolomite; dark-gray, coarse-grained dolomite; and a quartzite bed 1 m thick at the base. Occurs only north and northeast of Salt Lake City. Thickness about 150 m

Maxfield Limestone (Middle Cambrian)—Contains upper member of dark-gray, medium-bedded, oolitic dolomite; middle member of mottled dolomite, limestone, and nodular shale; and lower member of massive, dark-gray, mottled dolomite and limestone having yellowish-gray silty laminae. Occurs only in Wasatch Range. Thickness is 360 m north of City Creek

Ophir Formation (Middle Cambrian)—Contains upper member of blocky-weathering, calcareous sandstone; middle member of thin-bedded limestone having yellowish-gray silty laminae; and lower member of olive-gray, micaceous shale. Thickness is 125 m in Big and Little Cottonwood Canyons area. North of City Creek, members are not distinguishable and thickness is only 57 m

Tintic Quartzite (Middle and Lower Cambrian)—Medium- to thick-bedded, fine- to coarse-grained, white, pale-yellowish-gray, and pale-reddish-brown quartzite; conglomeratic beds in lower 100 m. Thickness 250–600 m in Wasatch Range. Discontinuous lenses of unit as much as 100 m thick locally are preserved below pre-Late Devonian unconformity around Uinta Mountains

Schist and gneiss (Archean)—Biotite-feldspar-quartz gneiss, garnet-biotite-feldspar-quartz gneiss, sillimanite-biotite schist, sillimanite-garnet-biotite schist and gneiss, hornblende-biotite schist, and less abundant layers of white, coarse-grained quartzite; lenses and layers of amphibolite. Pegmatite dikes and sills; pegmatites with sharp contacts tend to be discordant and to cut those with indistinct contacts. Discordant pegmatites with sharp contacts are generally 10–30 m long, but a few are several hundred meters long

Schist, gneiss, and quartzite (Archean)—Includes biotite-feldspar-quartz schist, sillimanite-biotite schist, sillimanite-garnet-biotite schist and gneiss, and interlayered, coarse-grained, white to pale-yellowish-green quartzite in beds as much as 10 m thick. Quartzite dominates much of the unit, has a grain size of 4–5 mm; contains some light-green muscovite and a few heavy mineral partings. Contact with units Afs is gradational

LEGEND:

Contact

Fault—Dashed where approximate or inferred; dotted where concealed. Many faults have a complex history; only the sense of most recent movement shown on map. Relative movement shown on cross section by arrow; double-headed arrow indicates opposite movement sense at different times.
A, away from observer, T, toward observe

High-angle—Bar and ball on downthrown side

Thrust—Sawteeth on upper plate

Folds—Arrow shows direction of plunge where known. Dashed where approximate or inferred: dotted where concealed

Anticline

Overturned anticline

Syncline

Overturned syncline

30 — Strike and dip of bedding
Inclined

60 — Overturned

Vertical

40 — Strike and dip of foliation and compositional layering where parallel
Inclined

60 — Strike and dip of foliation
Inclined

REFERENCE

Geologic map of the Salt Lake City 30' x 60' quadrangle, North-Central Utah, and Uinta County, Wyoming. . .
by Bruce Bryant 1990

Palynologic data from Cretaceous and lower Tertiary rocks in the Salt Lake City 30' x 60' quadrangle. . .
by D. J. Nichols and Bruce Bryant

LITTLE DELL LAKE
SALT LAKE CITY STREAMS, UTAH

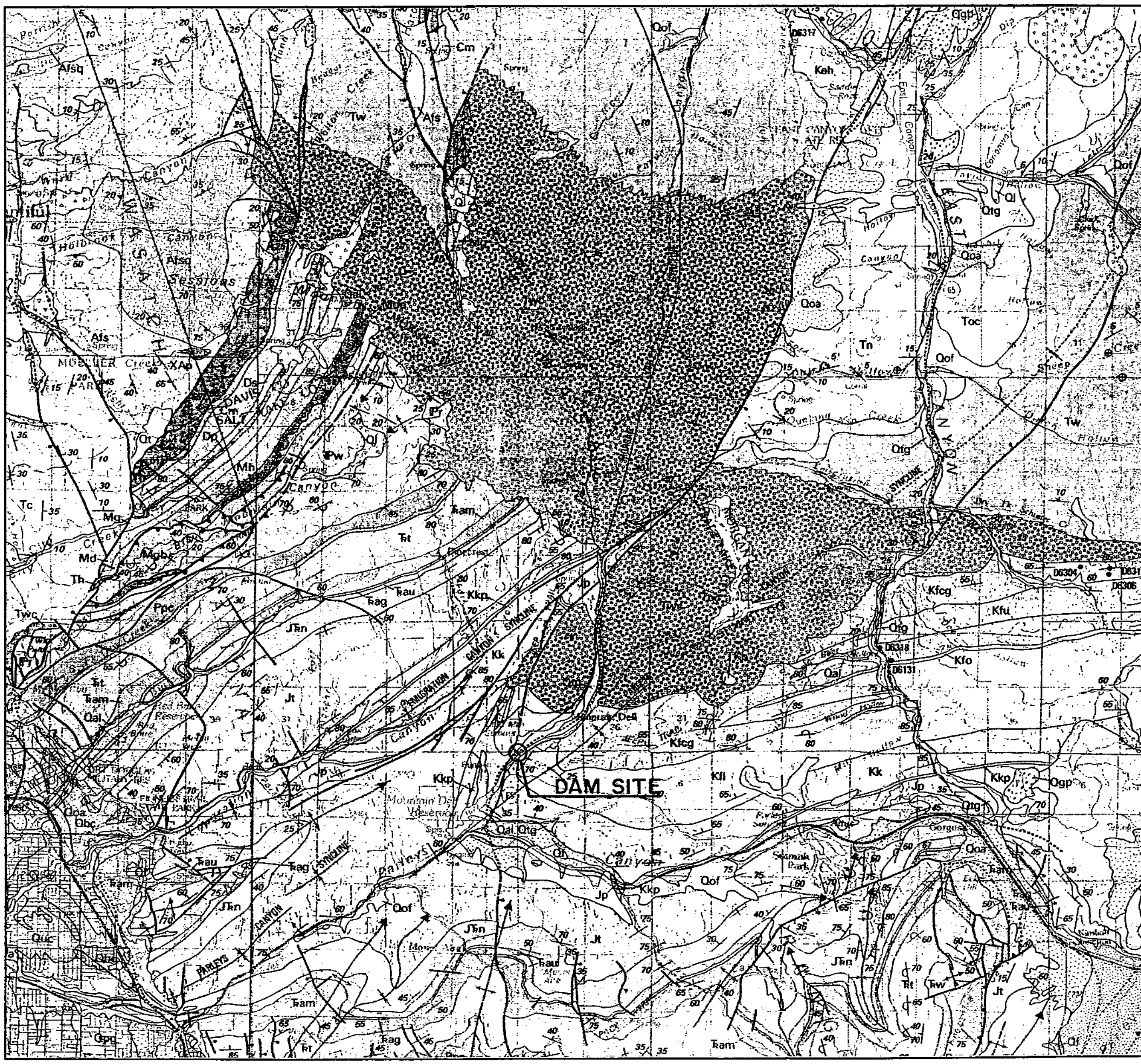
MAIN DAM
REGIONAL GEOLOGY
DESCRIPTION OF MAP UNITS

DEPARTMENT OF THE ARMY
SACRAMENTO DISTRICT, CORPS OF ENGINEERS
SACRAMENTO, CALIFORNIA

SUBMITTED: CARL E. COLE, RESIDENT GEOLOGIST

APPROVED: [signature] RESIDENT ENGINEER

ERE | | BAR | PLATE 9



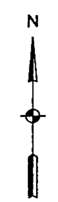
NOTES:

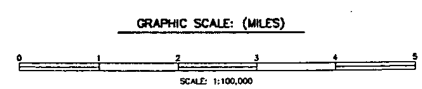
1. Refer to Plate 9 for legend and description of map geologic units.

REFERENCE/SOURCE:

Geologic map of the Salt Lake City 30' x 60' quadrangle, North-Central Utah, and Uinta County, Wyoming. . .
by Bruce Bryant 1990

Palynologic data from cretaceous and lower Tertiary rocks in the Salt Lake City 30' x 60' quadrangle. . .
by D. J. Nichols and Bruce Bryant





LITTLE DELL LAKE
SALT LAKE CITY STREAMS, UTAH
MAIN DAM
REGIONAL GEOLOGY

DEPARTMENT OF THE ARMY
SACRAMENTO DISTRICT, CORPS OF ENGINEERS
SACRAMENTO, CALIFORNIA

SUBMITTED: CARL E. COLE, RESIDENT GEOLOGIST

APPROVED: RESIDENT ENGINEER

ERE | BAB

PLATE 10

GEOLOGIC MAP LEGEND AND SYMBOLS

KELVIN AND FRONTIER FORMATIONS (BEDROCK)

Kf — FRONTIER FORMATION: Light to dark gray marine shale, sandstone, conglomeratic sandstone, and silty shale; coal; and gray, light red, grayish-red, and green claystone.

Kk — KELVIN FORMATION: Yellowish-gray, grayish-red, and light to moderate red sandstone; gray, reddish-brown, and grayish-red siltstone; gray, reddish-brown, and grayish-red siltstone, claystone, and conglomerate.

1 — SANDSTONE: Gray and brownish-gray; hard to very hard where unweathered; generally fine grained; slightly to highly fractured; solutioning evident along many fractures; fractures exhibit widths of one inch or greater in some cases; strikes of most open fractures are generally nearly perpendicular to bedding; calcareous-siliceous matrix; high permeabilities (300+ feet per day (Ft/d)) possible in moderately fractured zones where calcareous matrix has been dissolved along fractures. Numerous springs observed exiting thin beds of hard sandstone along downstream left abutment.

2 — SILTY SANDSTONE/SANDY SILTSTONE: Predominantly reddish-brown and reddish-brown with gray mottling; moderately soft to moderately hard where unweathered; intensely to slightly fractured; fracture widths generally smaller than in the gray sandstone; moderate permeabilities possible through fractures generally not along bedding; air slakes readily in some cases; calcareous; some thin beds and zones of gray sandstone as described above are included in these units.

3 — SILTSTONE: Predominantly brown and reddish-brown with gray mottling, some gray beds; generally moderately soft to soft; intensely to slightly fractured, fractures generally tight with some small openings; fracture orientations highly variable; low permeabilities; usually air slakes readily; calcareous.

4 — CLAYSTONE: Predominantly reddish-brown and gray mottled, some gray beds; generally soft to very soft; often intensely fractured; fractures generally tight and at random orientations; relatively impervious; air slakes readily; variably calcareous.

5 — CLAYSTONE: Light and dark gray, and greenish-gray beds; generally soft to very soft; generally intensely fractured with tight platy fractures; relatively impervious; air slakes readily; generally non-calcareous.

6 — ALTERED BED: Gray to gray-green; variably altered; very soft; intensely sheared; tight fractures.

6a — MONTMORILLONITE: Dark gray-green, variably altered; very soft; intensely sheared; tight fractures; slakes readily in water.

7 — CONGLOMERATE: Multicolored coarse material in gray matrix; hard to very hard matrix with very hard quartzitic coarse material where unweathered; generally slightly fractured at surface but highly fractured in cores from depth; large fractures often exceed 1 inch in width, open fractures generally not along bedding; calcareous matrix.

8 — INTRAFORMATIONAL BRECCIA: Dark gray to black with multicolored fragments; moderately soft to soft; highly to moderately fractured, fractures mostly tight.

OVERBURDEN

9 — SLOPEWASH: Sandy clay and clayey sand with gravel, cobble and boulder size sandstone fragments; brownish-gray and grayish-brown with light gray fragments; generally firm to stiff.

10 — FINE GRAINED OLDER ALLUVIUM: Sandy clay; brown to reddish-brown; generally firm with a soft area in the Random II foundation near Sta 19+00; 50 to 95 per cent medium to high plasticity fines with fine and very fine sand; damp where firm, wet where soft.

11 — OLDER ALLUVIUM-UPPER GRAVEL BED: Gravel and cobbles with boulders in a sandy and clayey sandy matrix; multicolored coarse material in a reddish brown matrix; dense to very dense; coarse material consists primarily of quartzite with smaller amounts of sandstone and limestone.

12 — OLDER ALLUVIUM-BASAL GRAVEL COBBLE BOULDER UNIT: Gravel, cobbles and boulders in a sandy and clayey sandy matrix; multicolored coarse material in a reddish brown matrix; dense; coarse material consists primarily of well rounded quartzite with smaller amounts of sandstone and limestone, generally becomes coarser with depth.

13 — YOUNGER ALLUVIUM (HOLOCENE): Boulders to pebble gravel, sand, silt, and clay deposited in channels and flood plains of streams. Light to dark gray, loose to dense.

14 — YOUNGER ALLUVIUM - SAND, GRAVEL, COBBLES AND BOULDERS: Light to dark gray, loose to dense.

LEGEND:

GEOLOGIC CONTACT

7° DIP / STRIKE — JOINT

SHEAR OR FAULT

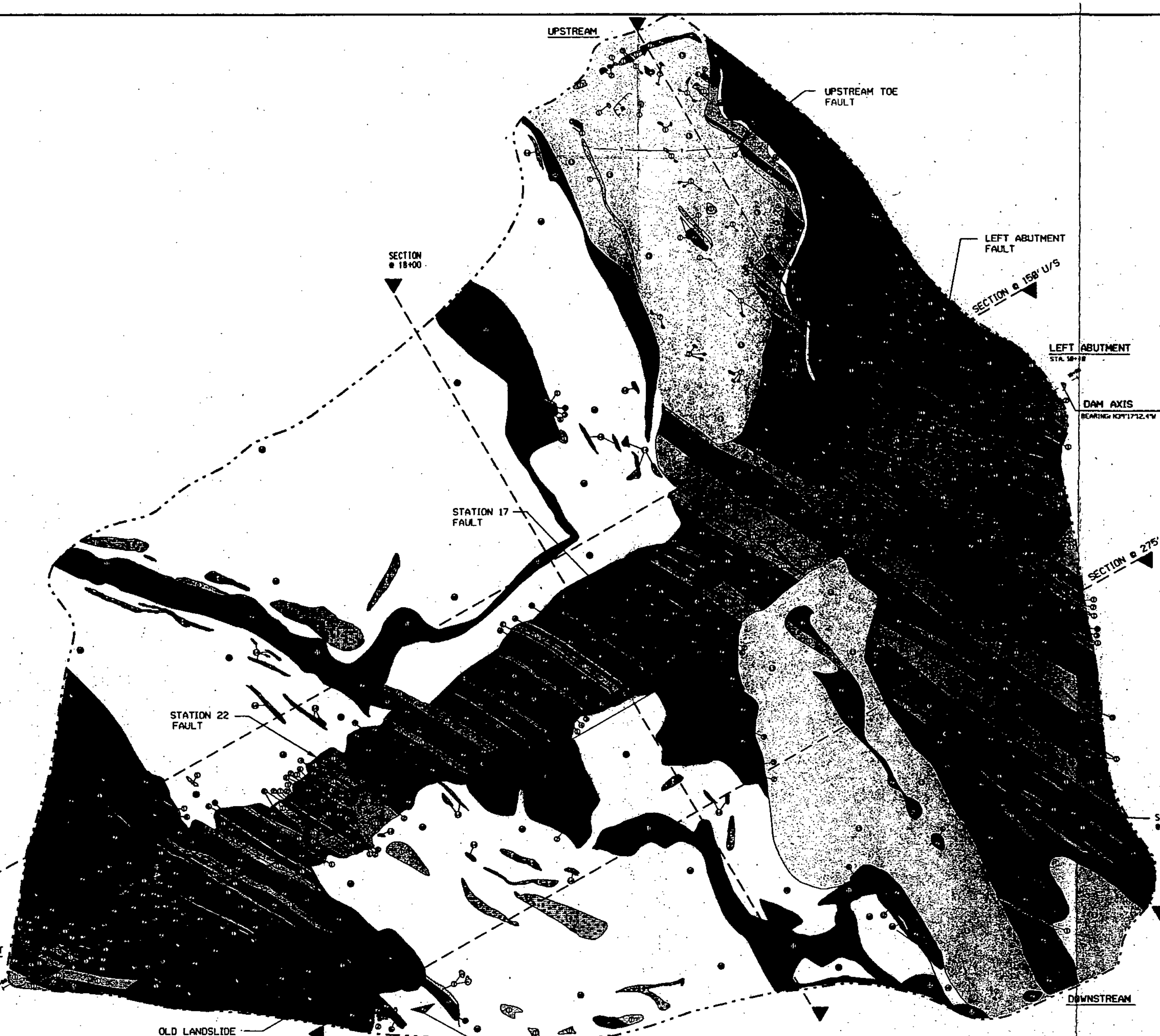
LITTLE DELL LAKE
SALT LAKE CITY STREAMS, UTAH
MAIN DAM
GEOLOGIC MAP
LEGEND AND SYMBOLS

DEPARTMENT OF THE ARMY
SACRAMENTO DISTRICT, CORPS OF ENGINEERS
SACRAMENTO, CALIFORNIA

SUBMITTED: CARL E. COLE, RESIDENT GEOLOGIST

APPROVED: RESIDENT ENGINEER

ERE | | CEC | PLATE 11

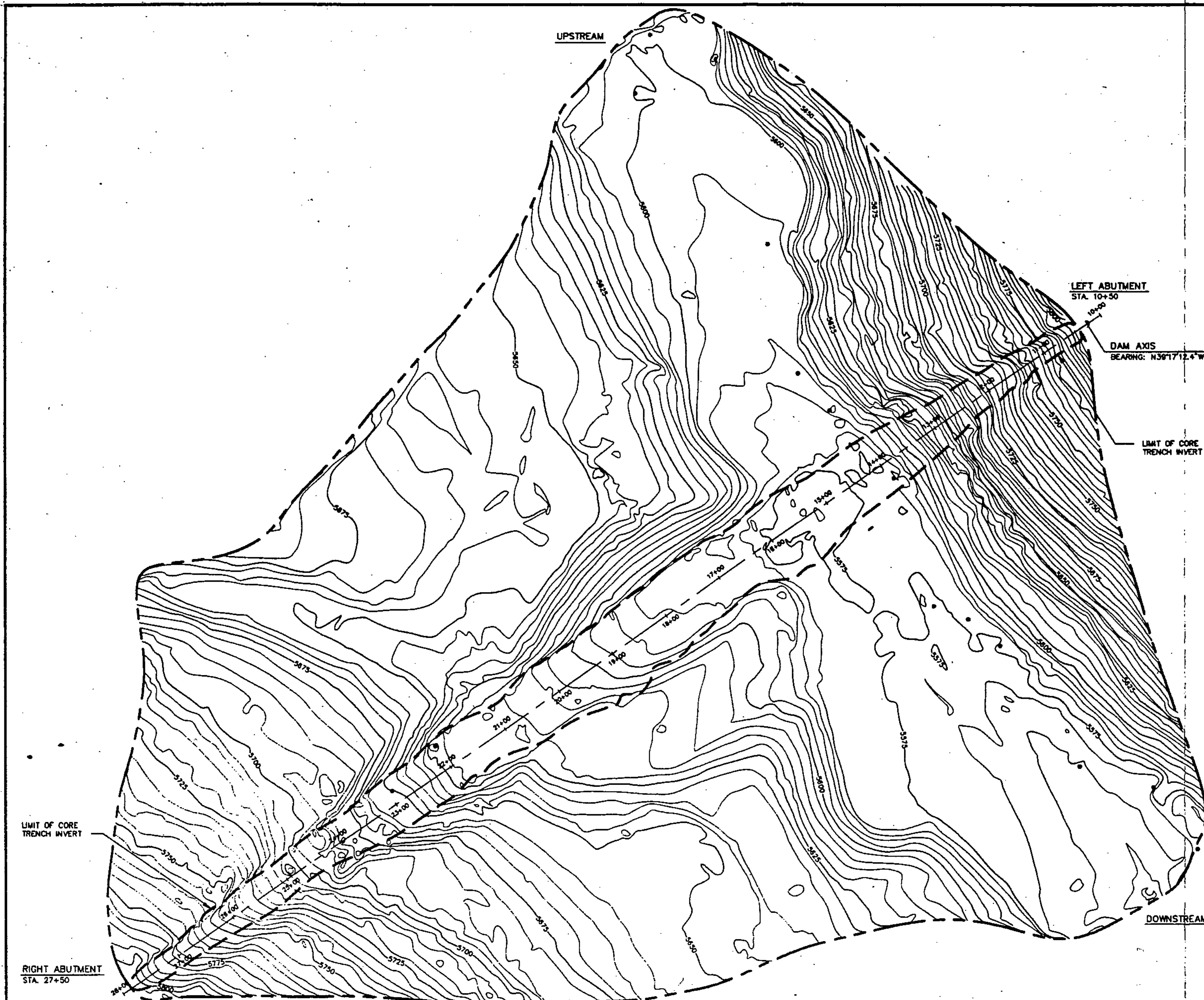


NOTE:
REFERENCE PLATE 11 FOR GEOLOGIC MAP LEGEND AND SYMBOLS AND DESCRIPTIONS

LITTLE DELL LAKE
SALT LAKE CITY STREAMS, UTAH
MAIN DAM
GEOLOGIC MAP
EMBANKMENT FOUNDATION

DEPARTMENT OF THE ARMY
SACRAMENTO DISTRICT, CORPS OF ENGINEERS
SACRAMENTO, CALIFORNIA

SUBMITTED: CARL E. COLE
APPROVED:
EME | CEC
PLATE 12



GENERAL NOTES:

1. TOPOGRAPHY DEVELOPED FROM CONTRACTOR SUPPLIED DATA DATED SEPT. 1993, BASED ON NCVD OF 1929.
2. TOPOGRAPHY PRODUCED BY U.S. ARMY CORPS OF ENGINEERS ON INTERGRAPH.
3. ELEVATIONS REFER TO MEAN SEA LEVEL DATUM.

LEGEND:

• SUMP LOCATION

GRAPHIC SCALE

0 50' 100' 150' 200' 250'

SCALE IN FEET

LITTLE DELL LAKE
SALT LAKE CITY STREAMS, UTAH

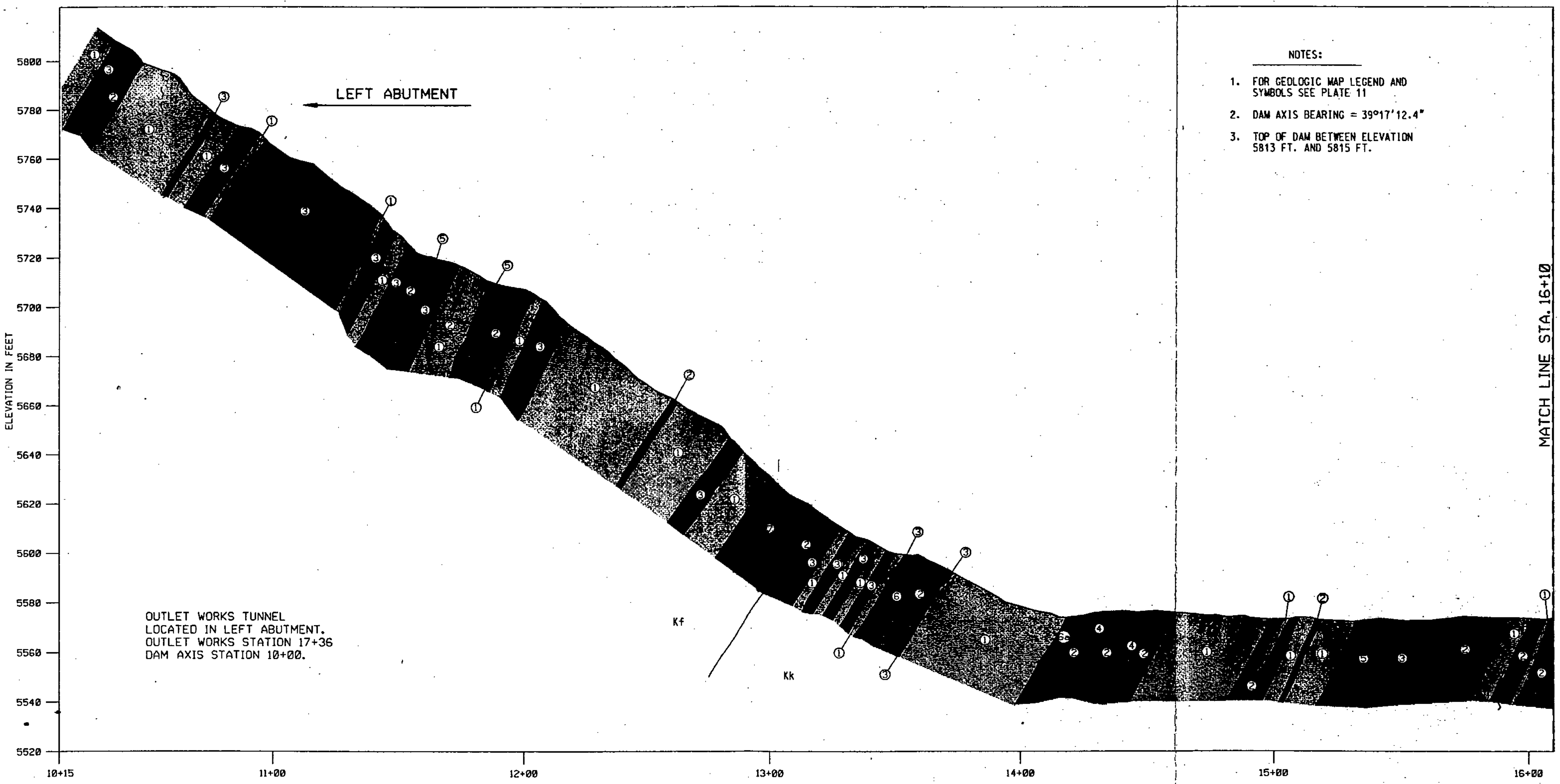
MAIN DAM
CONTOUR MAP
EMBANKMENT FOUNDATION

DEPARTMENT OF THE ARMY
SACRAMENTO DISTRICT, CORPS OF ENGINEERS
SACRAMENTO, CALIFORNIA

SUBMITTED: CARL E. COLE, RESIDENT GEOLOGIST

APPROVED: RESIDENT ENGINEER

ERE | | CEC | PLATE 13



NOTES:

1. FOR GEOLOGIC MAP LEGEND AND SYMBOLS SEE PLATE 11
2. DAM AXIS BEARING = 39°17'12.4"
3. TOP OF DAM BETWEEN ELEVATION 5813 FT. AND 5815 FT.

LITTLE DELL LAKE
SALT LAKE CITY STREAMS, UTAH

MAIN DAM

GEOLOGIC SECTION ALONG AXIS OF DAM
STA. 10+15 TO STA. 16+10

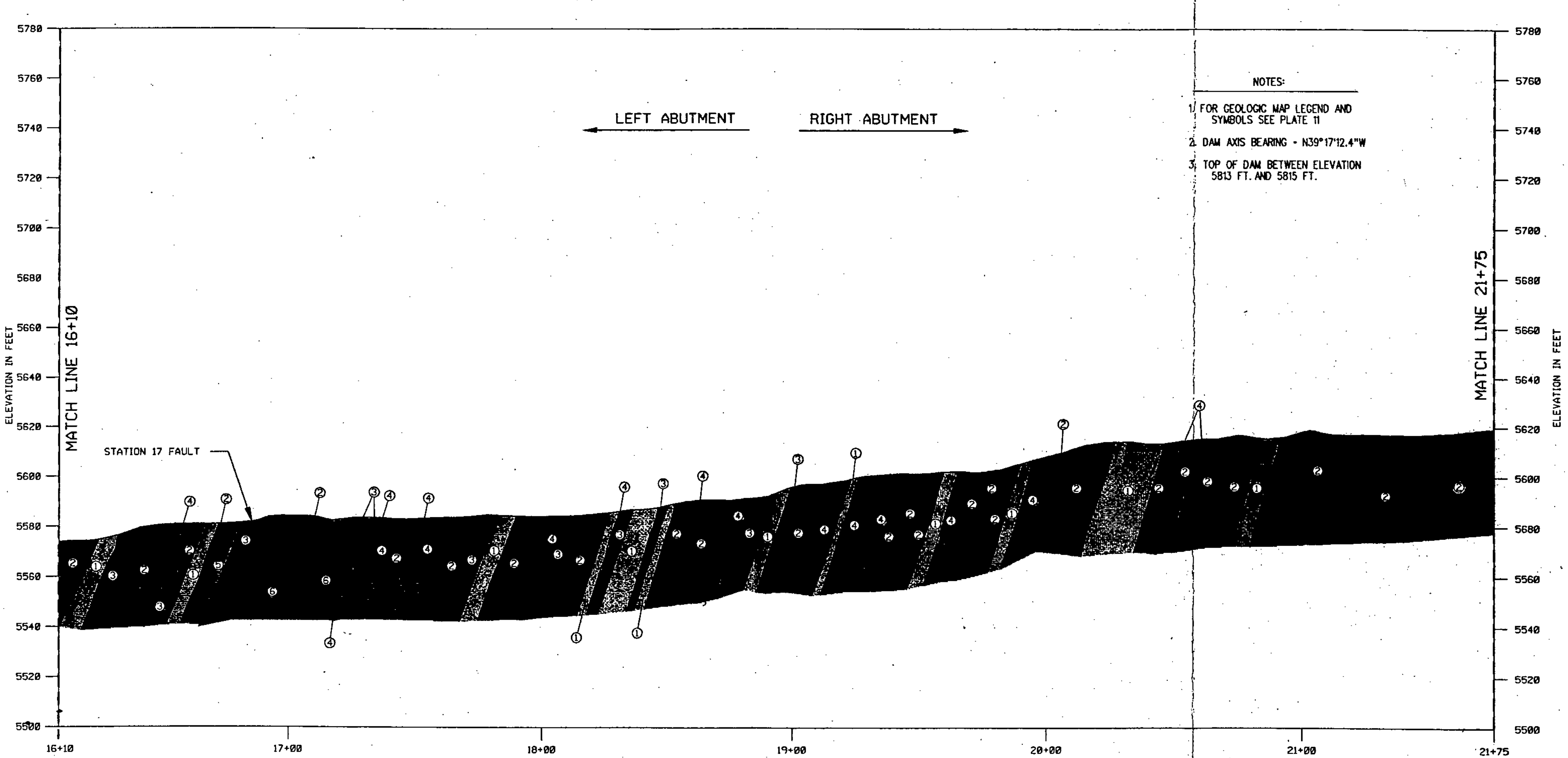
DEPARTMENT OF THE ARMY
SACRAMENTO DISTRICT, CORPS OF ENGINEERS
SACRAMENTO, CALIFORNIA

SUBMITTED: CARL E. COLE, RESIDENT GEOLOGIST

APPROVED: RESIDENT ENGINEER

ERE CEC

PLATE 14



NOTES:

1. FOR GEOLOGIC MAP LEGEND AND SYMBOLS SEE PLATE 11
2. DAM AXIS BEARING - N39°17'12.4"W
3. TOP OF DAM BETWEEN ELEVATION 5813 FT. AND 5815 FT.

GRAPHIC SCALE (FEET)

1" = 40'-0"   0   20   40   60   80   100

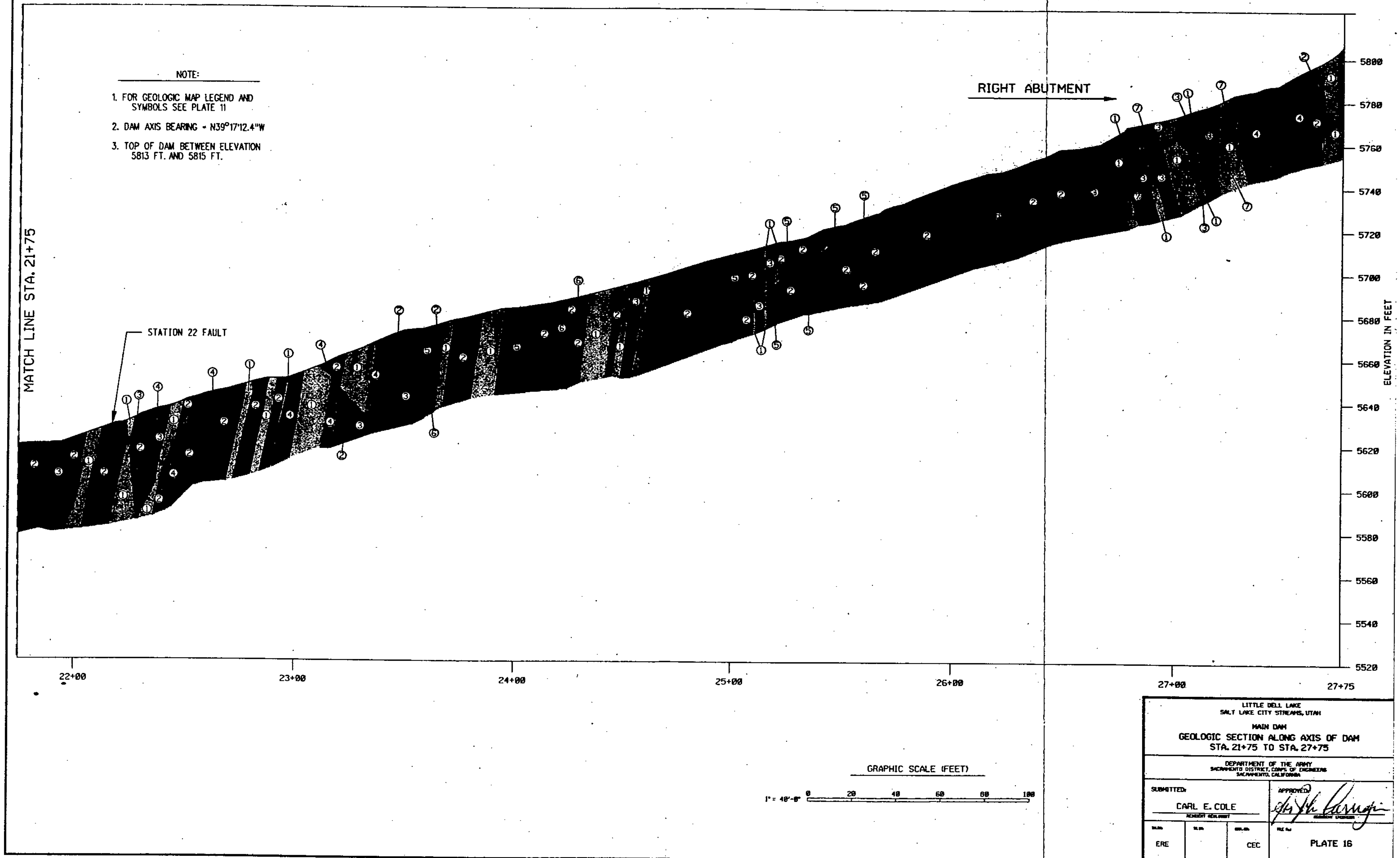
LITTLE DELL LAKE
SALT LAKE CITY STREAMS, UTAH

MAIN DAM

GEOLOGIC SECTION ALONG AXIS OF DAM
STA. 16+10 TO STA. 21+75

DEPARTMENT OF THE ARMY
SACRAMENTO DISTRICT, CORPS OF ENGINEERS
SACRAMENTO, CALIFORNIA

SUBMITTED:			APPROVED:
CARL E. COLE			
ERE		CEC	PLATE 15



LITTLE DELL LAKE
SALT LAKE CITY STREAMS, UTAH

MAIN DAM

GEOLOGIC SECTION ALONG AXIS OF DAM
STA. 21+75 TO STA. 27+75

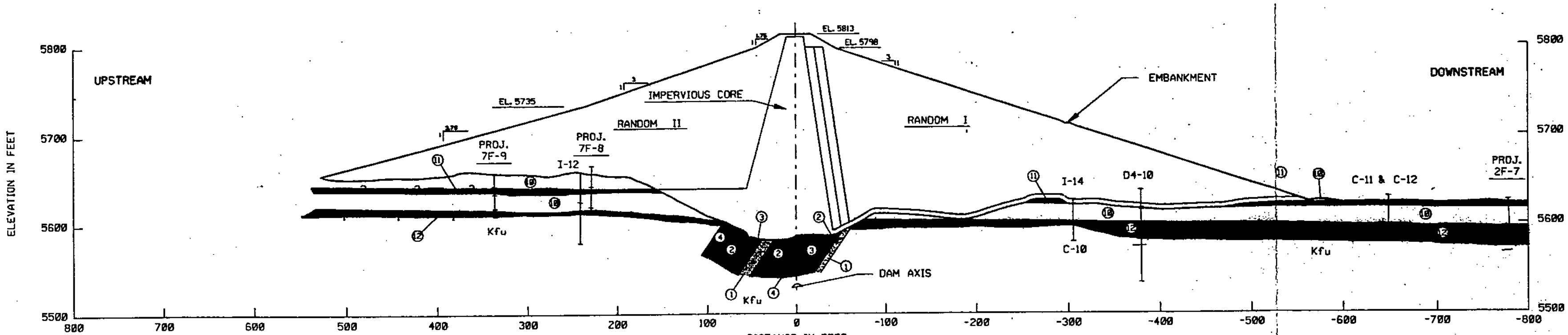
DEPARTMENT OF THE ARMY
SACRAMENTO DISTRICT, CORPS OF ENGINEERS
SACRAMENTO, CALIFORNIA

SUBMITTED: CARL E. COLE

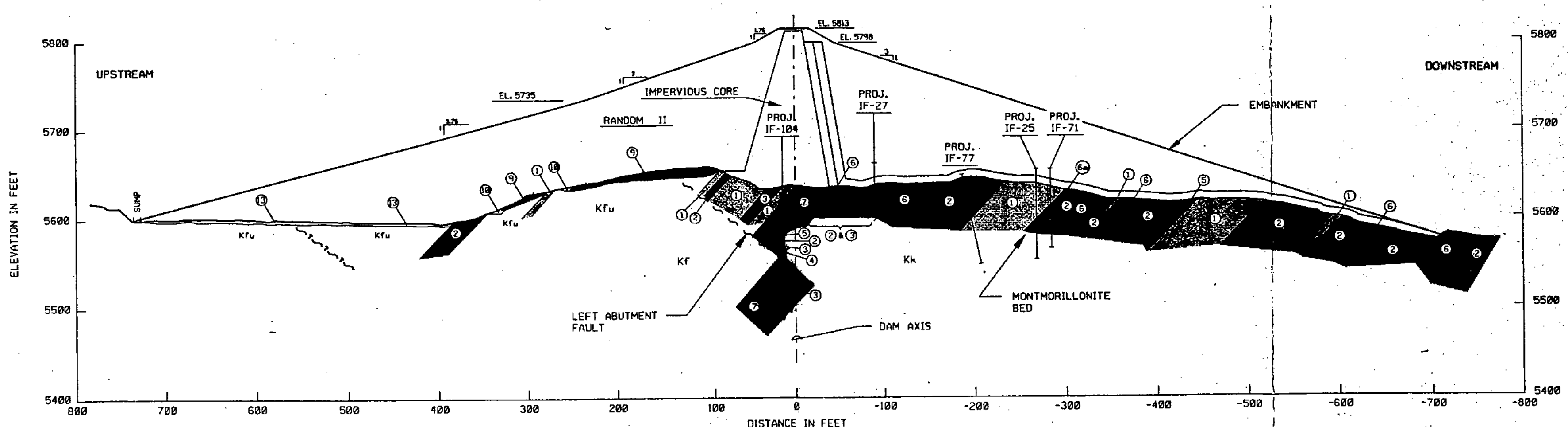
APPROVED:

ERE CEC

PLATE 16



SECTION ALONG STA. 18+00



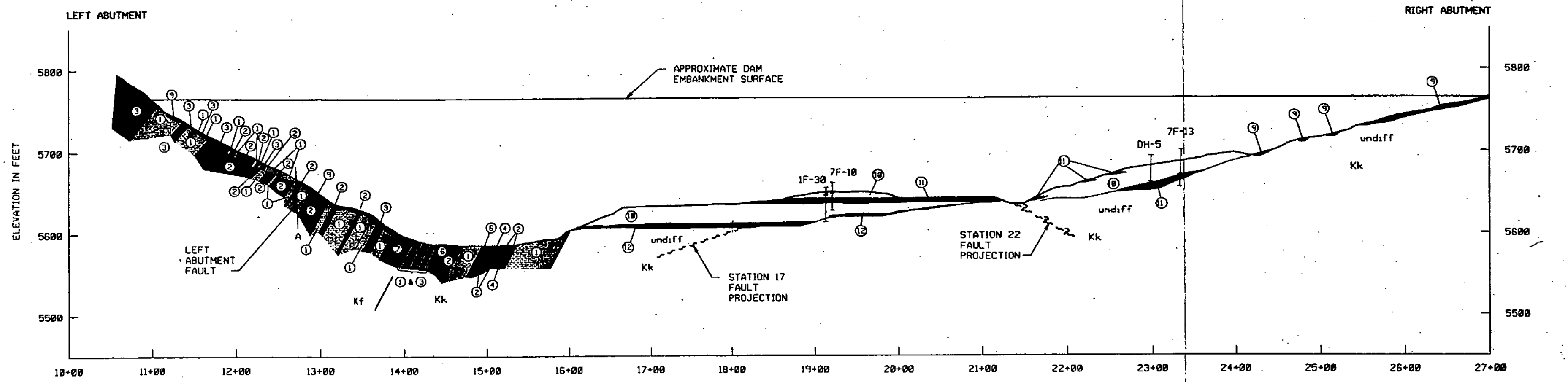
SECTION ALONG STA. 13+00

NOTE:
1. FOR GEOLOGIC MAP LEGEND AND SYMBOLS SEE PLATE 11.

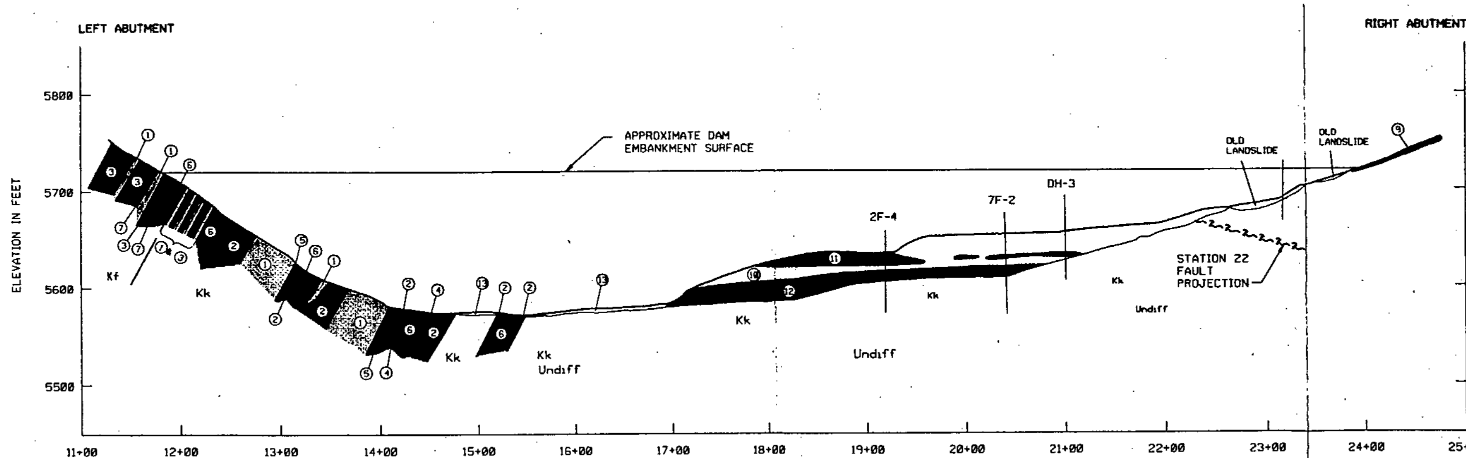
GRAPHIC SCALE (FEET)

1" = 125'-0" 0 125' 250'

LITTLE DELL LAKE SALT LAKE CITY STREAMS, UTAH MAIN DAM GEOLOGIC SECTION PERPENDICULAR TO AXIS AT STA. 13+00 AND STA. 18+00	
DEPARTMENT OF THE ARMY SACRAMENTO DISTRICT, CORPS OF ENGINEERS SACRAMENTO, CALIFORNIA	
SUBMITTED: CARL E. COLE, RESIDENT GEOLOGIST	APPROVED: RESIDENT ENGINEER
ERE	CEC
	PLATE 17



SECTION AT 150' U/S



SECTION AT 275' D/S

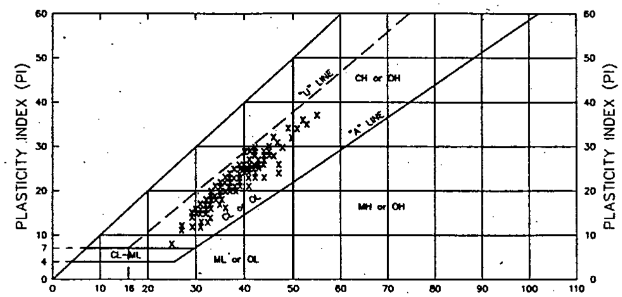
NOTE:
1. FOR GEOLOGIC MAP LEGEND AND SYMBOLS SEE PLATE 11.

GRAPHIC SCALE (FEET)

1" = 125'-0" 0 125' 250'

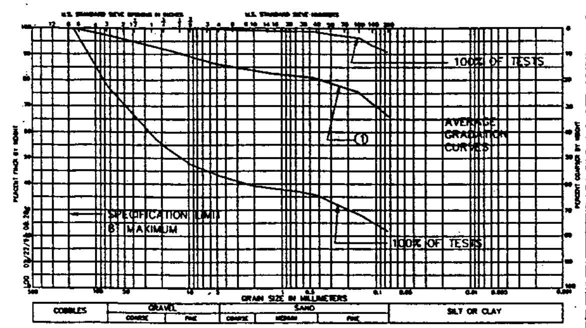
LITTLE DELL LAKE
SALT LAKE CITY STREAMS, UTAH
MAIN DAM
GEOLOGIC SECTIONS PARALLEL TO AXIS AT 275' D/S AND AT 150' U/S
DEPARTMENT OF THE ARMY
SACRAMENTO DISTRICT, CORPS OF ENGINEERS
SACRAMENTO, CALIFORNIA

SUBMITTED:			APPROVED:
CARL E. COLE, RESIDENT GEOLOGIST			RESIDENT ENGINEER
ERE		CEC	PLATE 18



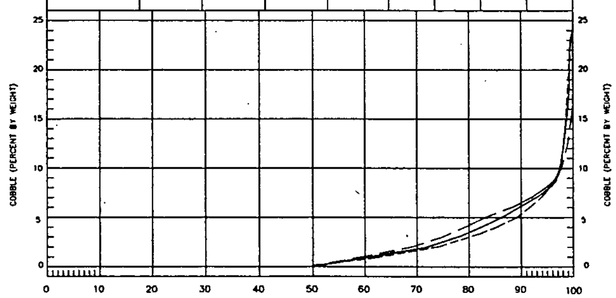
PLASTICITY CHART

NOTE: X REPRESENTS ALL TEST DATA FOR 1991 AND 1992.



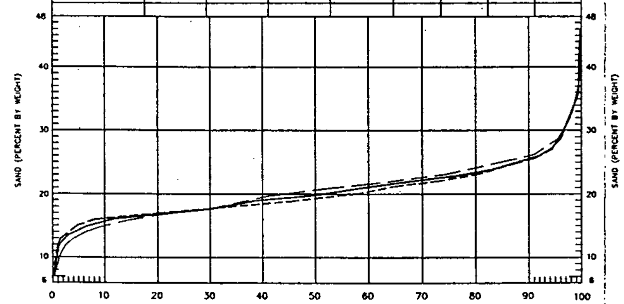
GRADATION CURVES

YEAR	FROM	TO	# TESTS	MEAN	STD DEV	≤ 10%	MEDIAN	≥ 90%
-------	01-01-92	12-31-92	192	1.7	3.4	0	0	5
— — —	01-01-91	12-31-91	132	2.0	3.1	0	0	6
———	01-01-90	12-31-92	325	1.8	3.3	0	0	6



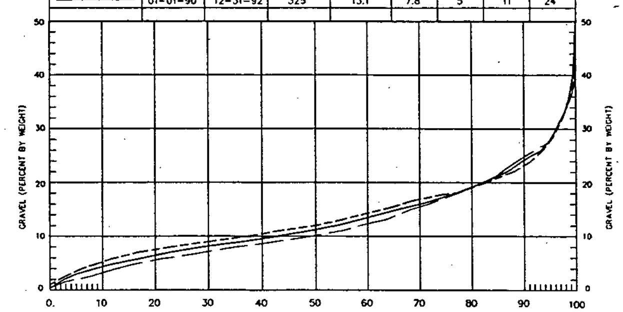
COBBLE – S-CURVE

YEAR	FROM	TO	# TESTS	MEAN	STD DEV	≤ 10%	MEDIAN	≥ 90%
-------	01-01-92	12-31-92	192	20.3	4.5	16	20	25
— — —	01-01-91	12-31-91	132	20.7	4.9	15	20	26
———	01-01-90	12-31-92	325	20.5	4.6	16	20	25



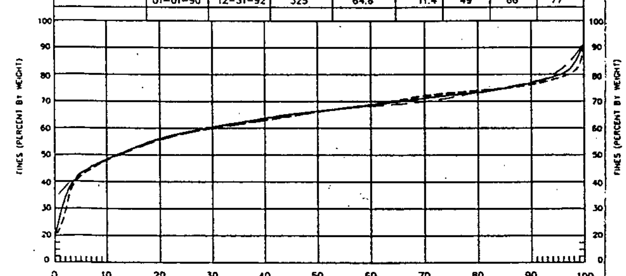
SAND – S-CURVE

YEAR	FROM	TO	# TESTS	MEAN	STD DEV	≤ 10%	MEDIAN	≥ 90%
-------	01-01-92	12-31-92	192	13.5	7.6	5	12	22
— — —	01-01-91	12-31-91	132	12.6	8.2	3	10	25
———	01-01-90	12-31-92	325	13.1	7.8	5	11	24



GRAVEL – S-CURVE

YEAR	FROM	TO	# TESTS	MEAN	STD DEV	≤ 10%	MEDIAN	≥ 90%
-------	01-01-92	12-31-92	192	64.4	11.7	49	66	77
— — —	01-01-91	12-31-91	132	64.7	10.9	48	66	76.5
———	01-01-90	12-31-92	325	64.6	11.4	49	66	77



FINES – S-CURVE

NOTES:

——— ① AVG. GRADATION 1991 & 1992

NOTE: AVG. GRADATION IN 1991 & 1992 ARE PRACTICALLY THE SAME

LEGEND

------- 1992
— — — 1991
——— 1990, 1991, & 1992
STD DEV STANDARD DEVIATION

LITTLE DELL LAKE
SALT LAKE CITY STREAMS, UTAH
EMBANKMENT
RANDOM I – CLASSIFICATION TEST RESULTS

DEPARTMENT OF THE ARMY
SACRAMENTO DISTRICT, CORPS OF ENGINEERS
SACRAMENTO, CALIFORNIA

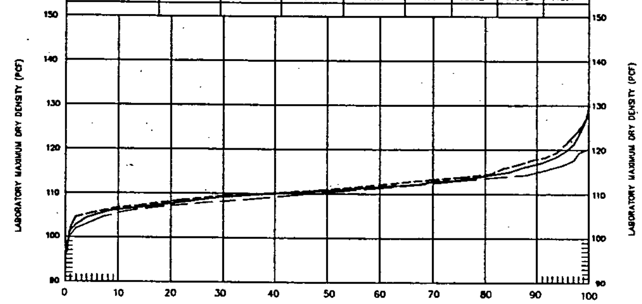
SUBMITTED: MICHAEL D. RAMSBOTHAM

APPROVED: RESIDENT ENGINEER

GEB | MDR

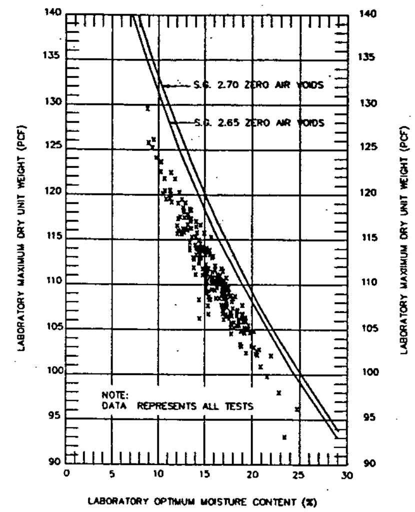
PLATE 19

YEAR	FROM	TO	# TESTS	MEAN	STD DEV	≤ 10%	MEDIAN	≥ 90%
- - - - - - -	01-01-92	12-31-92	191	111.6	4.7	106.5	110.8	117.6
— — — —	01-01-91	12-31-91	119	110.3	3.9	105.2	110.2	115.2
————	01-01-90	12-31-92	311	111.1	4.4	106.2	110.6	116.4



LABORATORY MAXIMUM DRY DENSITY – S-CURVE

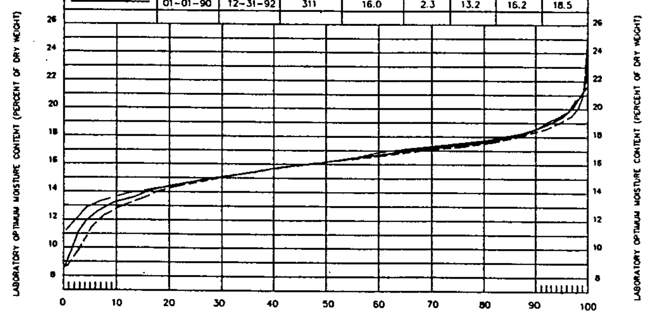
NOTE:
1. REFERENCE EM 1110-2-1906 AND ASTM D 698 STANDARD EFFORT



OPTIMUM MOISTURE VS. MAXIMUM DRY DENSITY

NOTE:
AVERAGE SPECIFIC GRAVITY = 2.6

YEAR	FROM	TO	# TESTS	MEAN	STD DEV	≤ 10%	MEDIAN	≥ 90%
- - - - - - -	01-01-92	12-31-92	191	15.9	2.4	12.7	16.2	18.4
— — — —	01-01-91	12-31-91	119	16.2	2.0	13.6	16.1	18.7
————	01-01-90	12-31-92	311	16.0	2.3	13.2	16.2	18.5



LABORATORY OPTIMUM MOISTURE CONTENT – S-CURVE

NOTE:
1. REFERENCE EM 1110-2-1906 AND ASTM D 698, STANDARD EFFORT

LEGEND

- - - - - - - 1992
— — — — 1991
———— 1990, 1991, & 1992

SG = SPECIFIC GRAVITY
PCF = POUNDS PER CUBIC F
STD DEV = STANDARD DEVIATION

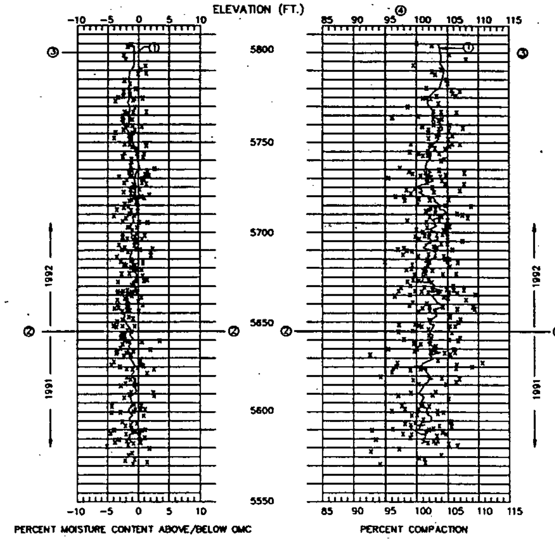
LITTLE DELL LAKE
SALT LAKE CITY STREAMS, UTAH
EMBANKMENT
RANDOM I – COMPACTION TEST RESULTS

DEPARTMENT OF THE ARMY
SACRAMENTO DISTRICT, CORPS OF ENGINEERS
SACRAMENTO, CALIFORNIA

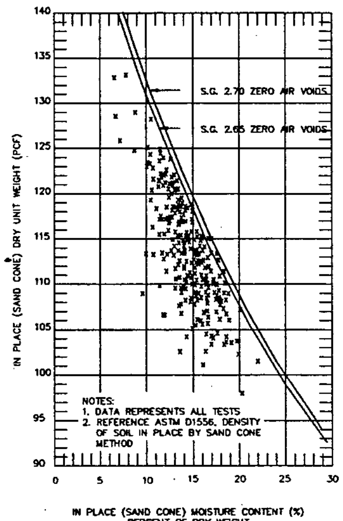
SUBMITTED: MICHAEL D. RAMSBOTHAM
APPROVED: RESIDENT ENGINEER

DR. BY: GEB | CHECKED BY: MDR

PLATE 20

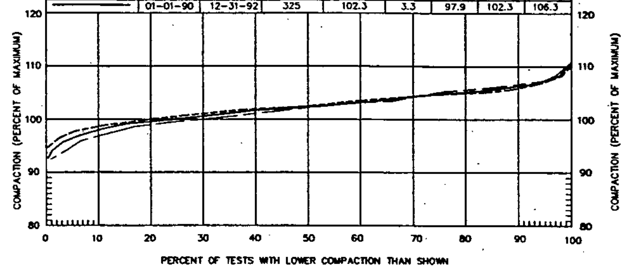


NOTES:
① CURVE REPRESENTS A RUNNING AVERAGE OF 10 TESTS
② APPROXIMATE ELEVATION OF THE RANDOM I SHELL AT THE END OF THE 1991 CONSTRUCTION SEASON
③ RANDOM II TYPE MATERIAL PLACED ABOVE ELEVATION 5798 FT.
④ 95% – DESIRED MINIMUM; 99% – DESIRED AVERAGE



MOISTURE VS. DENSITY

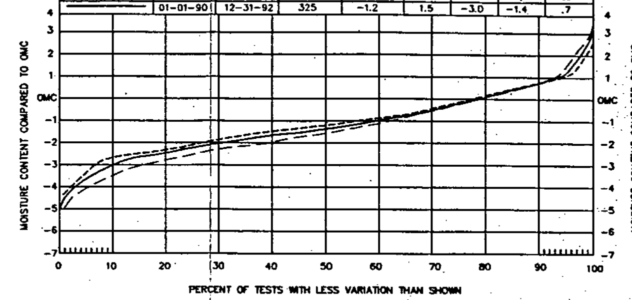
YEAR	FROM	TO	# TESTS	MEAN	STD DEV	≤ 10%	MEDIAN	≥ 90%
- - - - - - -	01-01-92	12-31-92	192	102.5	2.9	98.4	102.3	105.9
— — — —	01-01-91	12-31-91	132	102.0	3.8	96.9	102.0	106.4
———	01-01-90	12-31-92	325	102.3	3.3	97.9	102.3	106.3



IN PLACE COMPACTION – S-CURVE

NOTES:
① REFERENCE EM 1110-2-1906 AND ASTM D698, STANDARD EFFORT
② REFERENCE ASTM D 1556, DENSITY OF SOIL IN PLACE BY SAND CONE METHOD

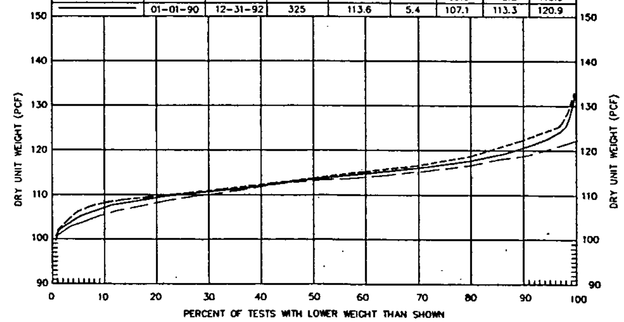
YEAR	FROM	TO	# TESTS	MEAN	STD DEV	≤ 10%	MEDIAN	≥ 90%
- - - - - - -	01-01-92	12-31-92	192	-1.1	1.6	-2.7	-1.3	.7
— — — —	01-01-91	12-31-91	132	-1.4	1.6	-3.6	-1.6	.6
———	01-01-90	12-31-92	325	-1.2	1.5	-3.0	-1.4	.7



OMC COMPARISON – S-CURVES

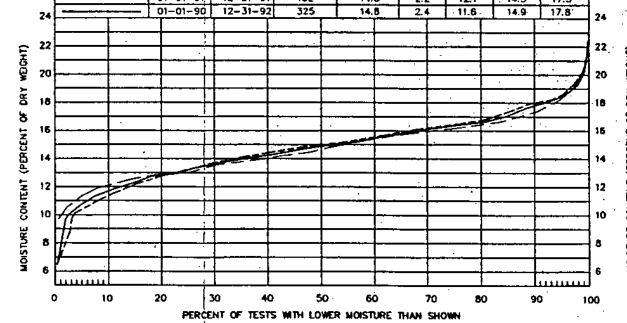
NOTES:
① REFERENCE EM 1110-2-1906 AND ASTM D698, STANDARD EFFORT
② MOISTURE CONTENT WAS DETERMINED AS PERCENT OF DRY WEIGHT
③ OMC = OPTIMUM MOISTURE CONTENT

YEAR	FROM	TO	# TESTS	MEAN	STD DEV	≤ 10%	MEDIAN	≥ 90%
- - - - - - -	01-01-92	12-31-92	192	114.3	5.7	108.1	113.6	121.9
— — — —	01-01-91	12-31-91	132	112.5	4.8	105.5	113.2	118.3
———	01-01-90	12-31-92	325	113.6	5.4	107.1	113.3	120.9



IN PLACE UNIT WEIGHT – S-CURVE

YEAR	FROM	TO	# TESTS	MEAN	STD DEV	≤ 10%	MEDIAN	≥ 90%
- - - - - - -	01-01-92	12-31-92	192	14.8	2.6	11.4	15.0	17.9
— — — —	01-01-91	12-31-91	132	14.8	2.2	12.1	14.5	17.3
———	01-01-90	12-31-92	325	14.8	2.4	11.6	14.9	17.8



IN PLACE MOISTURE CONTENT – S-CURVE

LEGEND

- - - - - - - 1992
— — — — 1991
——— 1990, 1991, & 1992

PCF = POUNDS PER CUBIC FOOT
OMC = OPTIMUM MOISTURE CONTENT
SG = SPECIFIC GRAVITY
STD DEV = STANDARD DEVIATION

LITTLE DELL LAKE
SALT LAKE CITY STREAMS, UTAH
EMBANKMENT
RANDOM I – CONSTRUCTION PLACEMENT DATA

DEPARTMENT OF THE ARMY
SACRAMENTO DISTRICT, CORPS OF ENGINEERS
SACRAMENTO, CALIFORNIA

SUBMITTED:
MICHAEL D. RAMSBOTHAM

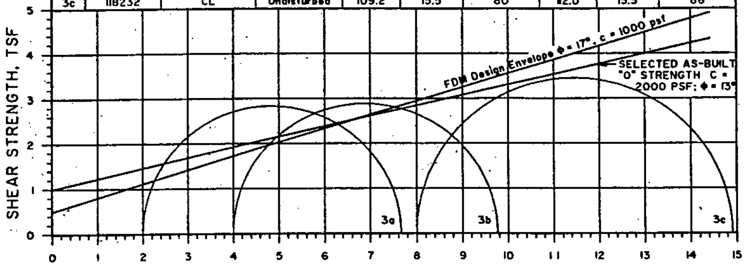
APPROVED:
RESIDENT ENGINEER

GEB
MDR

PLATE 21

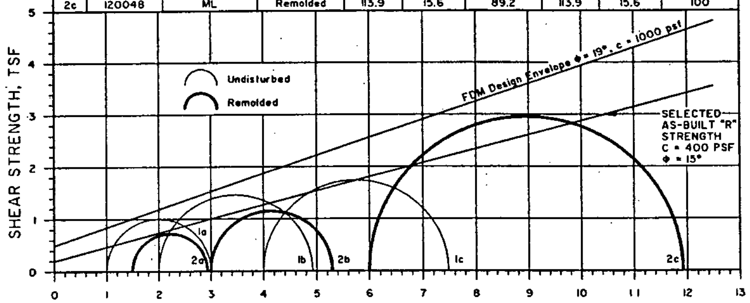
LITTLE DELL PROJECT: PL-21 24 MAY 94 NLB

NO.	DIVISION SAMPLE NO.	MATERIAL CLASS. SYMBOL	TYPE OF SAMPLE	PROPERTIES INITIAL DRY DENSITY (PCF)	INITIAL MOISTURE CONTENT (%)	INITIAL SATURATION (%)	BEFORE SHEAR DRY DENSITY (PCF)	BEFORE SHEAR MOISTURE CONTENT (%)	BEFORE SHEAR SATURATION (%)
3a	118230	CL	Undisturbed	109.3	15.1	78	110.4	15.1	80
3b	118231	CL	Undisturbed	107.8	15.7	78	110.2	15.7	83
3c	118232	CL	Undisturbed	109.2	15.5	80	112.0	15.5	86

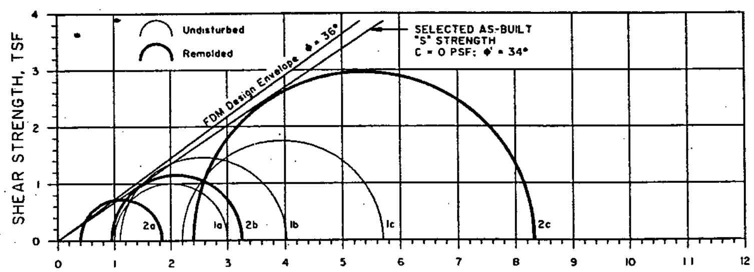


"Q" TRIAXIAL SHEAR STRENGTH (RANDOM I)

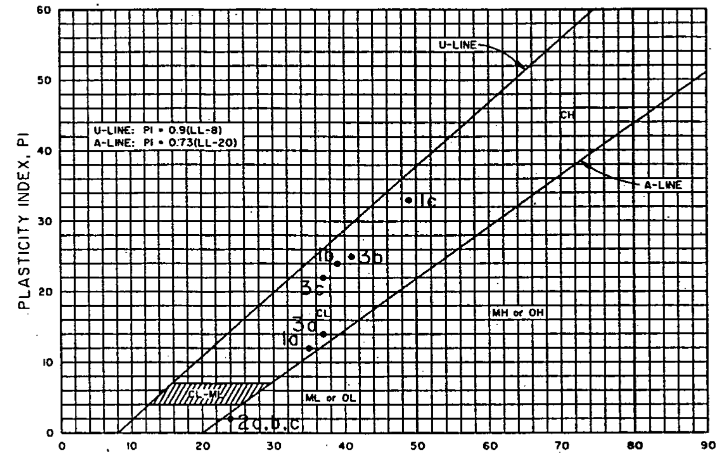
NO.	DIVISION SAMPLE NO.	MATERIAL CLASS. SYMBOL	TYPE OF SAMPLE	PROPERTIES INITIAL DRY DENSITY (PCF)	INITIAL MOISTURE CONTENT (%)	INITIAL SATURATION (%)	BEFORE SHEAR DRY DENSITY (PCF)	BEFORE SHEAR MOISTURE CONTENT (%)	BEFORE SHEAR SATURATION (%)
1a	117941	GC	Undisturbed	113.5	12.9	75	115.5	15.6	96
1b	117943	CL	Undisturbed	106.3	15.6	74	108.0	19.7	98
1c	117944	CL	Undisturbed	106.3	16.7	80	111.2	19.7	98
2a	120048	ML	Remolded	107.7	15.8	76.5	110.7	19.1	100
2b	120048	ML	Remolded	107.9	15.8	76.9	107.9	18.2	100
2c	120048	ML	Remolded	113.9	15.6	89.2	113.9	15.6	100



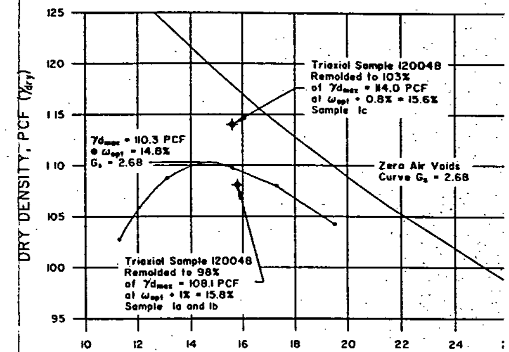
"$\overline{R}$" TRIAXIAL SHEAR STRENGTH (RANDOM I)



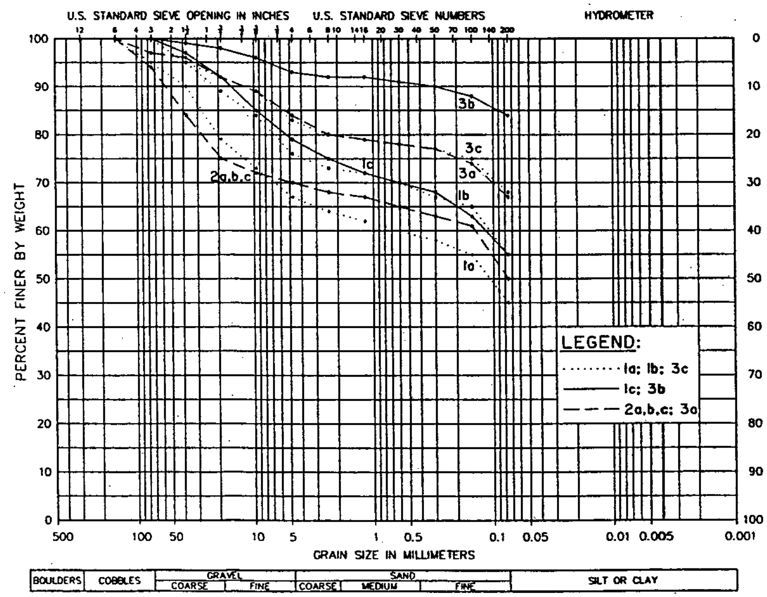
"S" TRIAXIAL SHEAR STRENGTH (RANDOM I)



ATTERBERG LIMITS (RANDOM I)



STANDARD COMPACTION TEST
(RANDOM I)



GRADATION CURVES (RANDOM I)

RECORD SAMPLING DATA
(RANDOM I)

DIVISION SAMPLE NO.	DATE OF SAMPLE	LOCATION STATION	ELEVATION (Feet)	OFFSET
117941	10-13 Aug 91	15+07	5625.0	305' d/s
117943	10-13 Aug 91	15+07	5625.0	305' d/s
117944	10-13 Aug 91	15+07	5625.0	305' d/s
118230	30 Oct - 3 Nov 91	17+50	5668.8	135' d/s
118231	30 Oct - 3 Nov 91	17+50	5668.8	135' d/s
118232	30 Oct - 3 Nov 91	17+50	5668.8	135' d/s
120048	15-22 Jun 92	Various	5780.0	Varies d/s
120048	15-22 Jun 92	Various	5780.0	Varies d/s
120048	15-22 Jun 92	Various	5780.0	Varies d/s

LITTLE DELL LAKE
SALT LAKE CITY STREAMS, UTAH

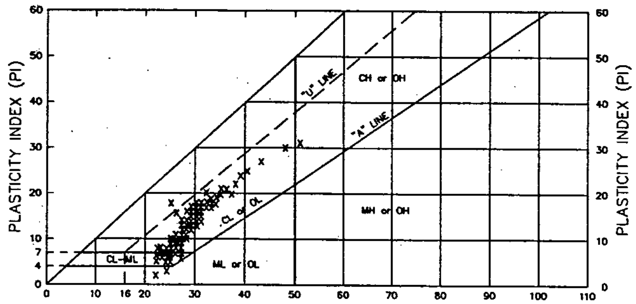
RANDOM I FILL
RECORD TEST RESULTS

DEPARTMENT OF THE ARMY
SACRAMENTO DISTRICT, CORPS OF ENGINEERS
SACRAMENTO, CALIFORNIA

SUBMITTED: DAVE RICKETTS
SUBMITTED: RESIDENT ENGINEER
DRAWN BY: N. BOLAND
CHECKED BY: D. R.

PLATE 22

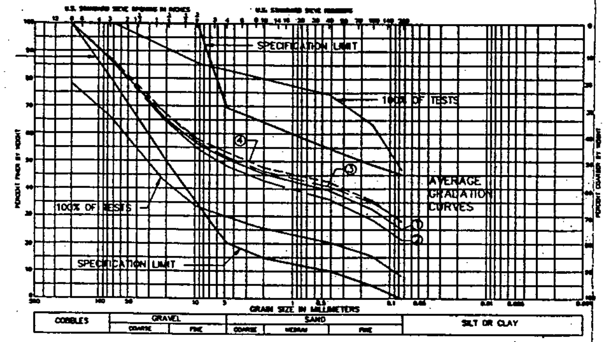
LITTLE DELL PROJECT: PL-22 24 MAY 94 NLD



LIQUID LIMIT (LL)

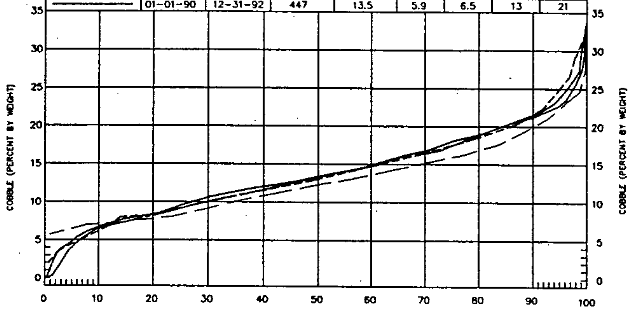
PLASTICITY CHART

NOTE: X REPRESENTS ALL TEST DATA FOR 1991 AND 1992.



GRADATION CURVES

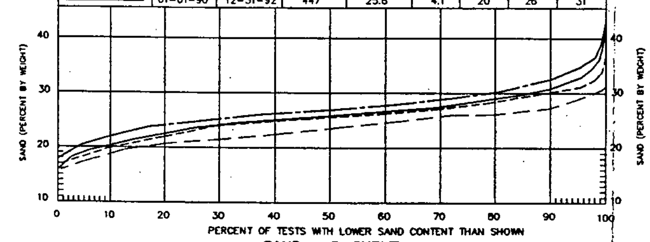
YEAR	FROM	TO	# TESTS	MEAN	STD DEV	≤ 10%	MEDIAN	≥ 90%
- - - - - - - -	01-01-92	12-31-92	165	12.6	6.2	6	13	21
— — — —	01-01-91	12-31-91	61	12.9	4.9	7	12	20
—— - ——	01-01-90	12-31-90	201	13.6	5.9	6.5	13	21
————	01-01-90	12-31-92	447	13.5	5.9	6.5	13	21



PERCENT OF TESTS WITH LOWER COBBLE CONTENT THAN SHOWN

COBBLE – S-CURVE

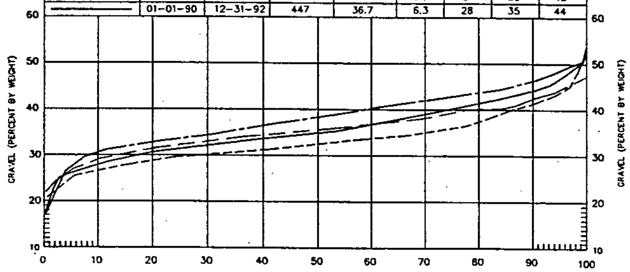
YEAR	FROM	TO	# TESTS	MEAN	STD DEV	≤ 10%	MEDIAN	≥ 90%
- - - - - - - -	01-01-92	12-31-92	165	25.4	3.7	20	25	30
— — — —	01-01-91	12-31-91	61	23.3	3.4	19	23	27
—— - ——	01-01-90	12-31-90	201	27.0	4.1	22	27	32
————	01-01-90	12-31-92	447	25.8	4.1	20	26	31



PERCENT OF TESTS WITH LOWER SAND CONTENT THAN SHOWN

SAND – S-CURVE

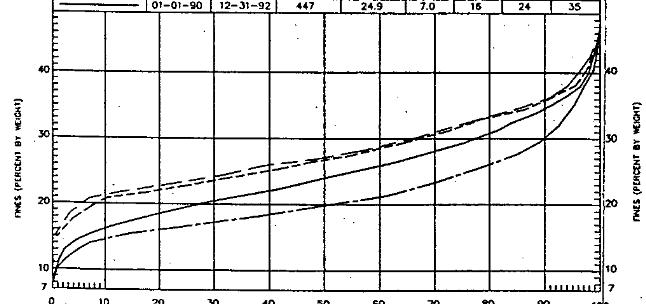
YEAR	FROM	TO	# TESTS	MEAN	STD DEV	≤ 10%	MEDIAN	≥ 90%
- - - - - - - -	01-01-92	12-31-92	165	33.3	5.6	26	33	41
— — — —	01-01-91	12-31-91	61	35.5	5.0	29	35	41
—— - ——	01-01-90	12-31-90	201	38.0	6.5	31	38	46
————	01-01-90	12-31-92	447	36.7	6.3	28	35	44



PERCENT OF TESTS WITH LOWER GRAVEL CONTENT THAN SHOWN

GRAVEL – S-CURVE

YEAR	FROM	TO	# TESTS	MEAN	STD DEV	≤ 10%	MEDIAN	≥ 90%
- - - - - - - -	01-01-92	12-31-92	165	27.7	6.0	21	27	36
— — — —	01-01-91	12-31-91	61	28.2	5.9	22	27	35
—— - ——	01-01-90	12-31-90	201	21.4	6.6	15	20	30
————	01-01-90	12-31-92	447	24.9	7.0	16	24	35



PERCENT OF TESTS WITH LOWER FINES CONTENT THAN SHOWN

FINES – S-CURVE

LEGEND

④ - - - - - - - - 1992
③ — — — — 1991
② —— - —— 1990
① ———— 1990, 1991, & 1992
STD DEV STANDARD DEVIATION

LITTLE DELL LAKE
SALT LAKE CITY STREAMS, UTAH

EMBANKMENT
RANDOM II – CLASSIFICATION TEST RESULTS

DEPARTMENT OF THE ARMY
SACRAMENTO DISTRICT, CORPS OF ENGINEERS
SACRAMENTO, CALIFORNIA

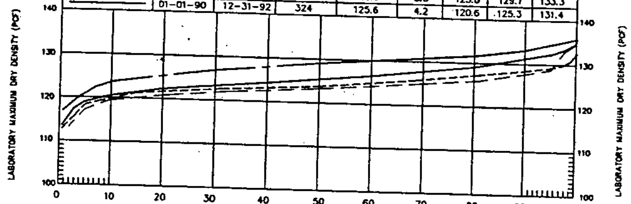
SUBMITTED: MICHAEL D. RAMSBOTHAM

APPROVED: RESIDENT ENGINEER

DR. BY: GEB | CHECKED BY: MDR

PLATE 23

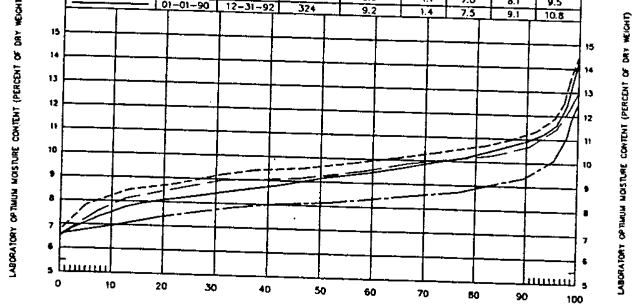
YEAR	FROM	TO	# TESTS	MEAN	STD DEV	≤ 10%	MEDIAN	≥ 90%
- - - - - - -	01-01-92	12-31-92	179	124.1	3.4	119.9	124.0	128.3
— — — —	01-01-91	12-31-91	35	123.7	3.6	119.6	123.3	127.4
——— — ———	01-01-90	12-31-90	110	128.6	3.8	123.8	129.1	133.3
—————	01-01-90	12-31-92	324	125.6	4.2	120.6	125.3	131.4



LABORATORY MAXIMUM DRY DENSITY – S-CURVE

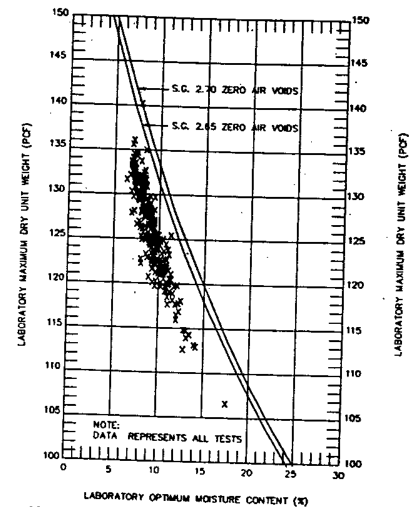
NOTE:
1. REFERENCE EM 1110-2-1906 AND ASTM D 698 STANDARD EFFORT

YEAR	FROM	TO	# TESTS	MEAN	STD DEV	≤ 10%	MEDIAN	≥ 90%
- - - - - - -	01-01-92	12-31-92	179	9.7	1.2	8.3	9.6	11.2
— — — —	01-01-91	12-31-91	35	9.4	1.2	8.0	9.2	10.6
——— — ———	01-01-90	12-31-90	110	8.3	1.1	7.0	8.1	9.5
—————	01-01-90	12-31-92	324	9.2	1.4	7.5	9.1	10.8



LABORATORY OPTIMUM MOISTURE CONTENT – S-CURVE

NOTE:
1. REFERENCE EM 1110-2-1906 AND ASTM D 698, STANDARD EFFORT



OPTIMUM MOISTURE VS. MAXIMUM DRY DENSITY

NOTE:
AVERAGE SPECIFIC GRAVITY = 2.6

LEGEND

④ - - - - - - - 1992
③ — — — — 1991
② ——— — ——— 1990
① ————— 1990, 1991, & 1992
STD DEV STANDARD DEVIATION
PCF POUNDS PER CUBIC FOOT
SG SPECIFIC GRAVITY

LITTLE DELL LAKE
SALT LAKE CITY STREAMS, UTAH

EMBANKMENT
RANDOM II – COMPACTION TEST RESULTS

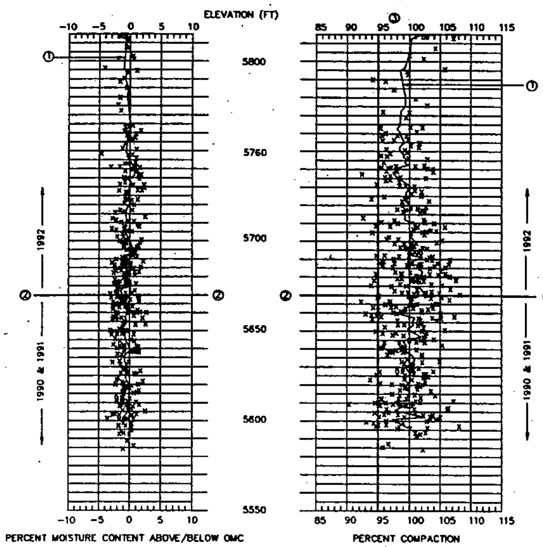
DEPARTMENT OF THE ARMY
SACRAMENTO DISTRICT, CORPS OF ENGINEERS
SACRAMENTO, CALIFORNIA

SUBMITTED: MICHAEL D. RAMSBOTHAM

APPROVED: RESIDENT ENGINEER

GEB MDR

PLATE 24

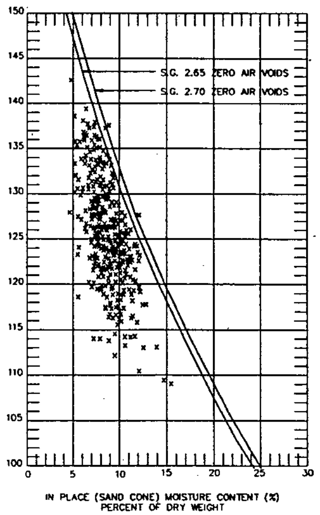


NOTES:

① CURVE REPRESENTS A RUNNING AVERAGE OF 10 TESTS

② COFFERDAM REACHED EL. 5685 TO EL. 5690 AT THE CREST. APPROXIMATE ELEVATION OF THE RANDOM II SHELL AT THE END OF THE 1991 CONSTRUCTION SEASON WAS 5670 FT.

③ 95% - DESIRED MINIMUM; 99% - DESIRED AVERAGE

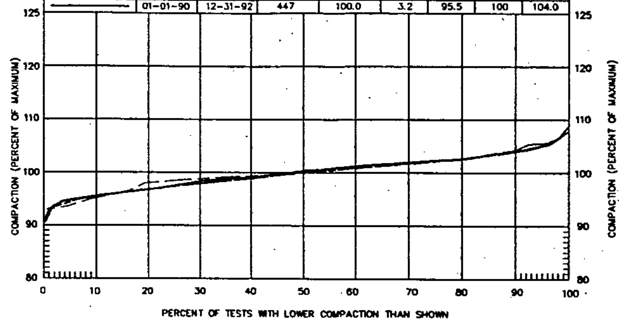


MOISTURE VS. DENSITY

NOTES:

1. DATA REPRESENTS ALL TESTS
2. REFERENCE ASTM D1556, DENSITY OF SOIL IN PLACE BY SAND CONE METHOD

YEAR	FROM	TO	# TESTS	MEAN	STD DEV	≤ 10%	MEDIAN	≥ 90%
1992	01-01-92	12-31-92	185	100.0	3.2	95.6	100	103.9
1991	01-01-91	12-31-91	61	100.3	3.3	95.5	100.2	103.9
1990	01-01-90	12-31-90	201	99.9	3.3	95.5	99.9	104.0
1990, 1991, & 1992	01-01-90	12-31-92	447	100.0	3.2	95.5	100	104.0



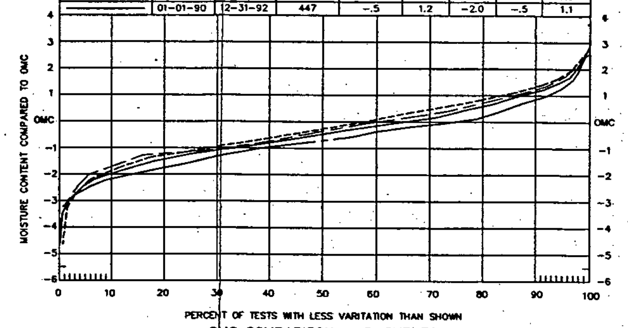
IN PLACE COMPACTION - S-CURVE

NOTES:

① REFERENCE EM 1110-2-1906 AND ASTM D698, STANDARD EFFORT

② REFERENCE ASTM D 1556, DENSITY OF SOIL IN PLACE BY SAND CONE METHOD

YEAR	FROM	TO	# TESTS	MEAN	STD DEV	≤ 10%	MEDIAN	≥ 90%
1992	01-01-92	12-31-92	185	-.3	1.3	-1.9	-.4	1.3
1991	01-01-91	12-31-91	61	-.26	1.2	-1.7	-.4	1.0
1990	01-01-90	12-31-90	201	-.7	1.2	-2.1	-.7	0.9
1990, 1991, & 1992	01-01-90	12-31-92	447	-.5	1.2	-2.0	-.5	1.1



OMC COMPARISON - S-CURVES

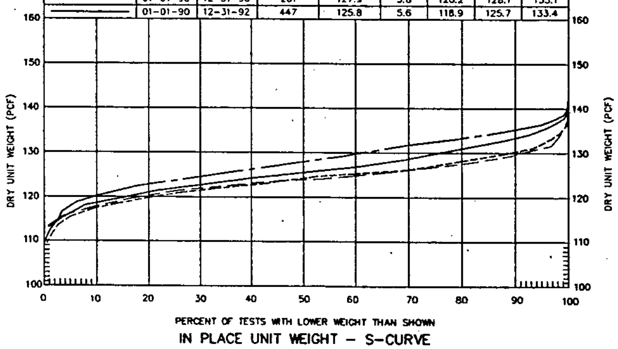
NOTES:

① REFERENCE EM 1110-2-1906 AND ASTM D698, STANDARD EFFORT

② REFERENCE ASTM D 1556, DENSITY OF SOIL IN PLACE BY SAND CONE METHOD

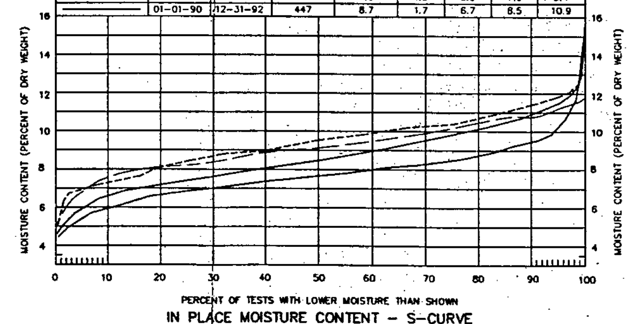
③ OMC = OPTIMUM MOISTURE CONTENT

YEAR	FROM	TO	# TESTS	MEAN	STD DEV	≤ 10%	MEDIAN	≥ 90%
1992	01-01-92	12-31-92	185	124.1	4.9	117.5	124.4	129.8
1991	01-01-91	12-31-91	61	124.1	4.4	118.2	123.9	128.7
1990	01-01-90	12-31-90	201	127.9	5.8	120.2	128.1	135.1
1990, 1991, & 1992	01-01-90	12-31-92	447	125.8	5.6	118.9	125.7	133.4



IN PLACE UNIT WEIGHT - S-CURVE

YEAR	FROM	TO	# TESTS	MEAN	STD DEV	≤ 10%	MEDIAN	≥ 90%
1992	01-01-92	12-31-92	185	9.4	1.6	7.2	9.5	11.4
1991	01-01-91	12-31-91	61	9.2	1.3	7.4	9.2	10.8
1990	01-01-90	12-31-90	201	7.8	1.5	6.0	7.6	9.4
1990, 1991, & 1992	01-01-90	12-31-92	447	8.7	1.7	6.7	8.5	10.9



IN PLACE MOISTURE CONTENT - S-CURVE

LEGEND

- 1992
- 1991
- 1990
- 1990, 1991, & 1992

PCF = POUNDS PER CUBIC FOOT
OMC = OPTIMUM MOISTURE CONTENT
SG = SPECIFIC GRAVITY
STD DEV = STANDARD DEVIATION

LITTLE DELL LAKE
SALT LAKE CITY STREAMS, UTAH

EMBANKMENT

RANDOM II - CONSTRUCTION PLACEMENT DATA

DEPARTMENT OF THE ARMY
SACRAMENTO DISTRICT, CORPS OF ENGINEERS
SACRAMENTO, CALIFORNIA

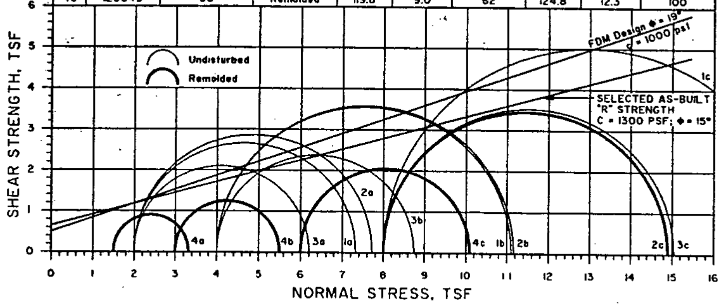
SUBMITTED: MICHAEL D. RAMSBOTHAM

APPROVED: RESIDENT ENGINEER

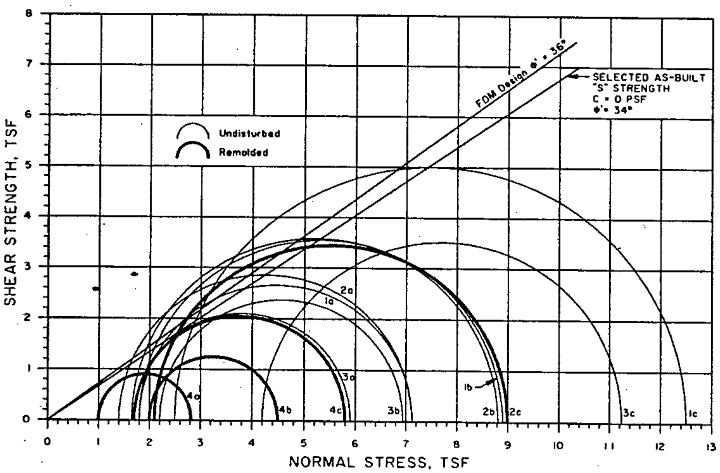
GEB | MDR

PLATE 25

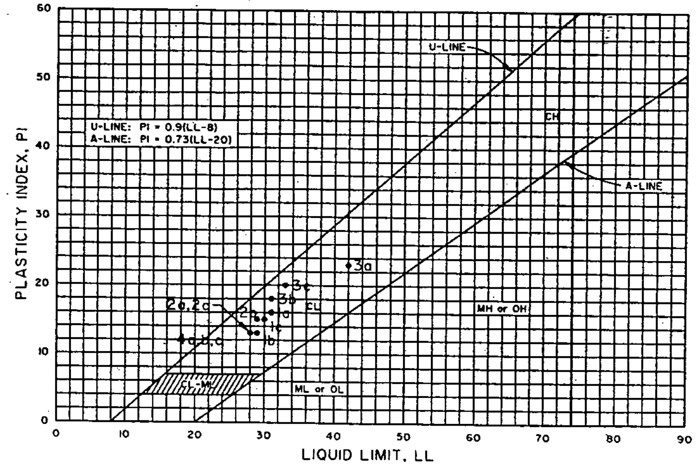
NO.	DIVISION SAMPLE NO.	MATERIAL CLASS. SYMBOL	TYPE OF SAMPLE	PROPERTIES					
				INITIAL			BEFORE SHEAR		
				DRY DENSITY (PCF)	MOISTURE CONTENT (%)	SATURATION (%)	DRY DENSITY (PCF)	MOISTURE CONTENT (%)	SATURATION (%)
1a	113016	SC	Undisturbed	117.0	12.1	34	123.1	13.0	100
1b	113017	SC	Undisturbed	116.4	10.1	64	122.7	13.1	100
1c	113018	SC	Undisturbed	114.4	11.1	66	124.6	12.4	100
2a	114268	GC	Undisturbed	127.4	6.8	60	128.9	10.7	100
2b	114269	GC	Undisturbed	127.8	9.7	87	129.0	10.7	100
2c	114270	GC	Remolded	121.4	6.3	46	128.1	11.0	100
3a	118235	GC	Undisturbed	118.4	11.5	76	121.1	13.3	96
3b	118234	SC	Undisturbed	114.3	12.0	71	119.8	13.8	96
3c	118233	GC	Undisturbed	116.6	11.3	72	122.5	12.7	96
4a	120049	GC	Remolded	119.5	9.0	62	121.8	13.5	100
4b	120049	GC	Remolded	119.5	9.0	62	123.5	12.8	100
4c	120049	GC	Remolded	119.8	9.0	62	124.8	12.3	100



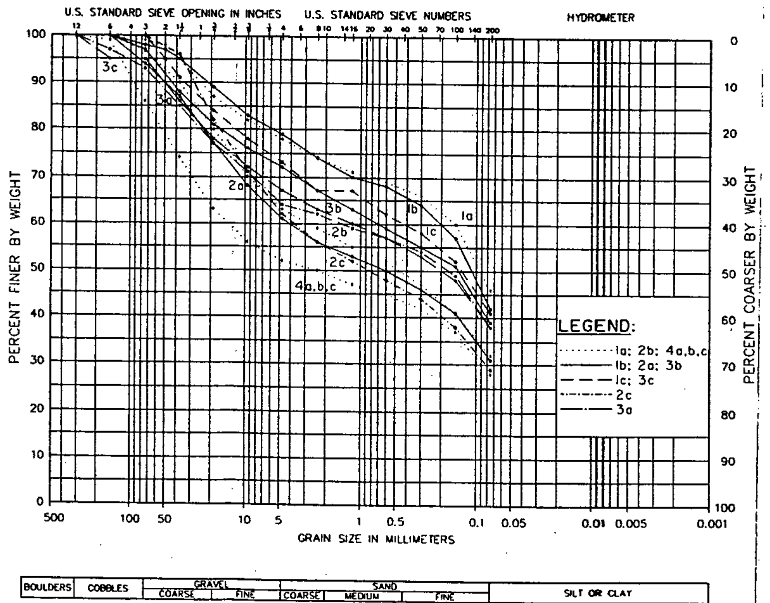
"R" TRIAXIAL SHEAR STRENGTH (RANDOM II)



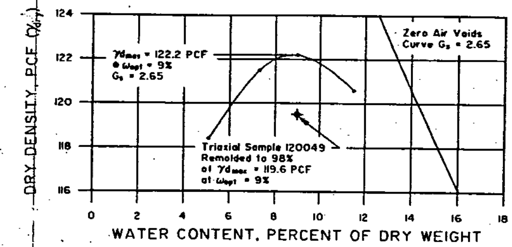
"S" TRIAXIAL SHEAR STRENGTH (RANDOM II)



ATTERBERG LIMITS (RANDOM II)



GRADATION CURVES (RANDOM II)



STANDARD COMPACTION TEST (RANDOM II)

RECORD SAMPLING DATA (RANDOM II)

DIVISION SAMPLE NO.	DATE OF SAMPLE	LOCATION		
		STATION	ELEVATION (Feet)	OFFSET
113016	5-7 Jun 90	22+50	5666.5	320.5' u/s
113017	5-7 Jun 90	22+50	5666.5	320.5' u/s
114268	8-9 Sep 90	12+75	5682.0	410' u/s
114269	8-9 Sep 90	12+75	5682.0	410' u/s
114270	8-9 Sep 90	12+75	5682.0	410' u/s
118233	30 Oct - 3 Nov 91	17+50	5671.3	100' u/s
118234	30 Oct - 3 Nov 91	17+50	5671.3	100' u/s
118235	30 Oct - 3 Nov 91	17+50	5671.3	100' u/s
120049	15-22 Jun 92	Various	5780.0	Varies u/s

LITTLE DELL LAKE
SALT LAKE CITY STREAMS, UTAH

RANDOM II FILL
RECORD TEST RESULTS

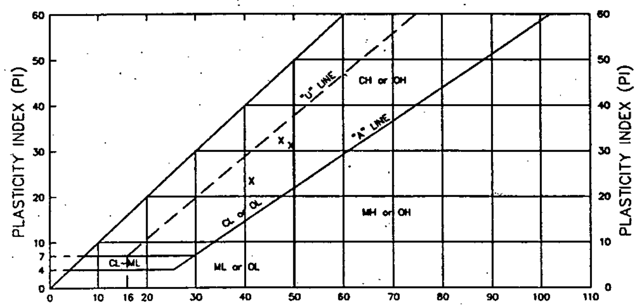
DEPARTMENT OF THE ARMY
SACRAMENTO DISTRICT, CORPS OF ENGINEERS
SACRAMENTO, CALIFORNIA

SUBMITTED: DAVE RICKETTS

SUBMITTED: RESIDENT ENGINEER

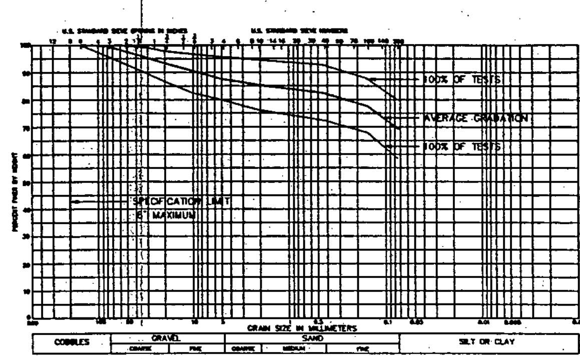
DRAWN BY: H. BOLAND | CHECKED BY: D. R.

PLATE 26



PLASTICITY CHART

NOTE: X REPRESENTS ALL TEST DATA.



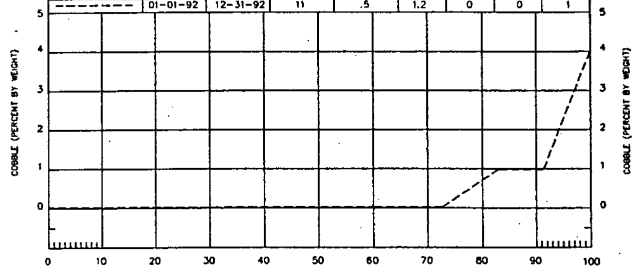
GRADATION CURVES

NOTES:

① AVERAGE GRADATION 1992

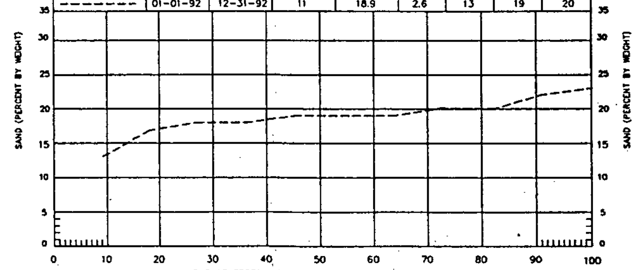
② REPRESENTS MATERIAL PLACED BETWEEN EL. 5665 AND EL. 5686.5

YEAR	FROM	TO	# TESTS	MEAN	STD DEV	≤ 10%	MEDIAN	≥ 90%
--------	01-01-92	12-31-92	11	.5	1.2	0	0	1



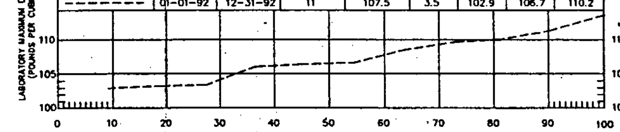
COBBLE - S-CURVE

YEAR	FROM	TO	# TESTS	MEAN	STD DEV	≤ 10%	MEDIAN	≥ 90%
--------	01-01-92	12-31-92	11	18.9	2.6	13	19	20



SAND - S-CURVE

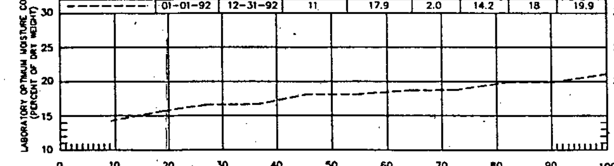
YEAR	FROM	TO	# TESTS	MEAN	STD DEV	≤ 10%	MEDIAN	≥ 90%
--------	01-01-92	12-31-92	11	107.5	3.5	102.9	106.7	110.2



LABORATORY MAXIMUM DRY DENSITY - S-CURVE

NOTE: ① REFERENCE EM 1110-2-1906 AND ASTM D698, STANDARD EFFORT

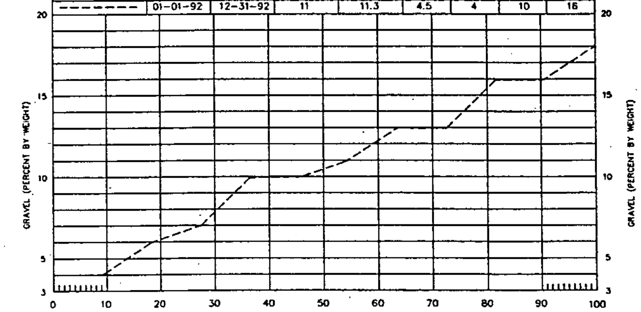
YEAR	FROM	TO	# TESTS	MEAN	STD DEV	≤ 10%	MEDIAN	≥ 90%
--------	01-01-92	12-31-92	11	17.9	2.0	14.2	18	19.9



LABORATORY OPTIMUM MOISTURE CONTENT - S-CURVE

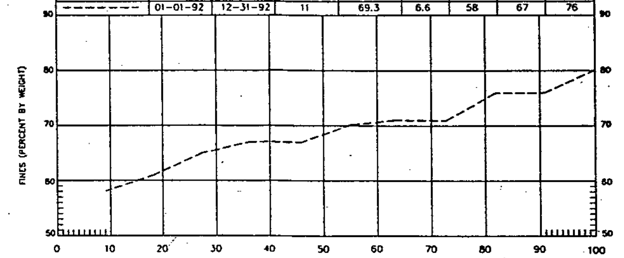
NOTE: ① REFERENCE EM 1110-2-1906 AND ASTM D698, STANDARD EFFORT

YEAR	FROM	TO	# TESTS	MEAN	STD DEV	≤ 10%	MEDIAN	≥ 90%
--------	01-01-92	12-31-92	11	11.3	4.5	4	10	16



GRAVEL - S-CURVE

YEAR	FROM	TO	# TESTS	MEAN	STD DEV	≤ 10%	MEDIAN	≥ 90%
--------	01-01-92	12-31-92	11	69.3	6.6	58	67	76



FINES - S-CURVE

LEGEND

-------- 1992
STD DEV STANDARD DEVIATION

LITTLE DELL LAKE
SALT LAKE CITY STREAMS, UTAH

EMBANKMENT
RANDOM IV
CLASSIFICATION AND COMPACTION TEST RESULTS

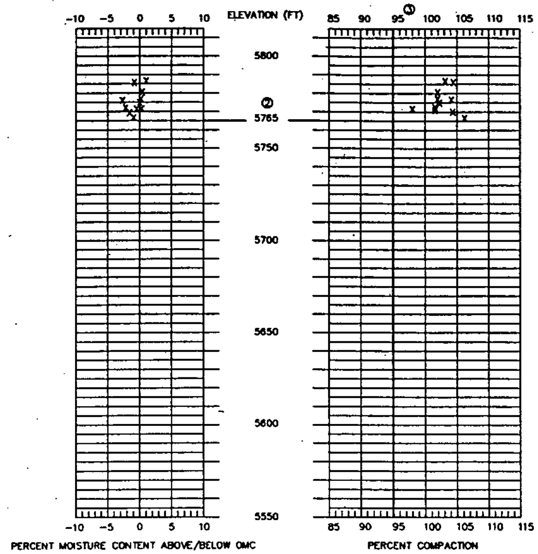
DEPARTMENT OF THE ARMY
SACRAMENTO DISTRICT, CORPS OF ENGINEERS
SACRAMENTO, CALIFORNIA

SUBMITTED: MICHAEL D. RAMSBOTHAM

APPROVED: RESIDENT ENGINEER

GEB | MDR

PLATE 27



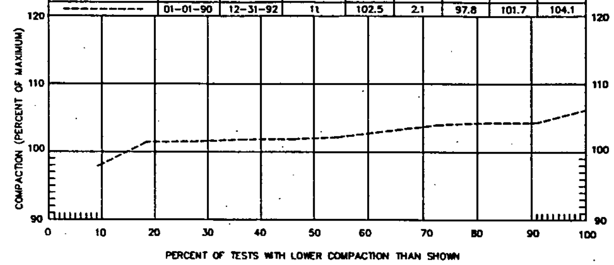
NOTES:

① RANDOM IV ZONE IS A PART OF THE U/S SHELL THAT WAS PREVIOUSLY RANDOM II BY DESIGN

② RANDOM IV WAS ONLY PLACED BETWEEN EL. 5765 AND EL. 5786.5

③ 95% – DESIRED MINIMUM; 99% – DESIRED AVERAGE

YEAR	FROM	TO	# TESTS	MEAN	STD DEV	≤ 10%	MEDIAN	≥ 90%
----------	01-01-90	12-31-92	11	102.5	2.1	97.8	101.7	104.1



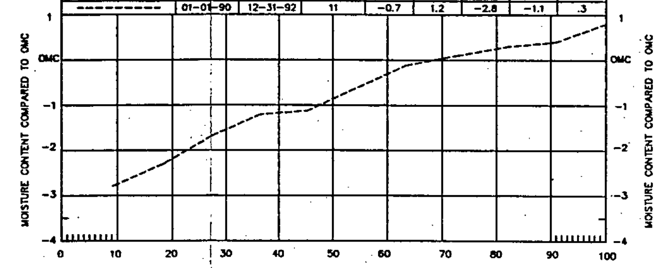
IN PLACE COMPACTION – S-CURVE

NOTES:

① REFERENCE EM 1110-2-1906 AND ASTM D698, STANDARD EFFORT

② REFERENCE ASTM D 1556, DENSITY OF SOIL IN PLACE BY SAND CONE METHOD

YEAR	FROM	TO	# TESTS	MEAN	STD DEV	≤ 10%	MEDIAN	≥ 90%
----------	01-01-90	12-31-92	11	-0.7	1.2	-2.8	-1.1	.3



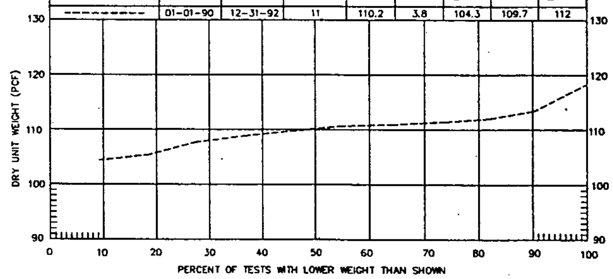
OMC COMPARISON – S-CURVES

NOTES:

① REFERENCE EM 1110-2-1906 AND ASTM D698, STANDARD EFFORT

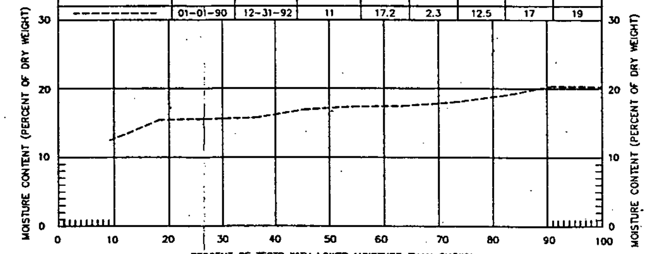
② REFERENCE ASTM D 1556, DENSITY OF SOIL IN PLACE BY SAND CONE METHOD

YEAR	FROM	TO	# TESTS	MEAN	STD DEV	≤ 10%	MEDIAN	≥ 90%
----------	01-01-90	12-31-92	11	110.2	3.8	104.3	109.7	112



IN PLACE UNIT WEIGHT – S-CURVE

YEAR	FROM	TO	# TESTS	MEAN	STD DEV	≤ 10%	MEDIAN	≥ 90%
----------	01-01-90	12-31-92	11	17.2	2.3	12.5	17	19



IN PLACE MOISTURE CONTENT – S-CURVE

LEGEND

---------- 1992

OMC = OPTIMUM MOISTURE CONTENT
PCF = POUNDS PER CUBIC FOOT
STD DEV = STANDARD DEVIATION

LITTLE DELL LAKE
SALT LAKE CITY STREAMS, UTAH

EMBANKMENT

RANDOM IV – CONSTRUCTION PLACEMENT DATA

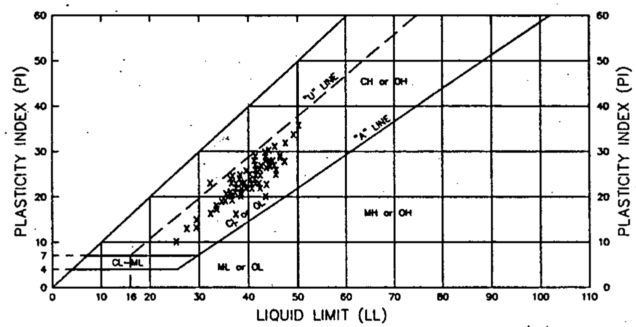
DEPARTMENT OF THE ARMY
SACRAMENTO DISTRICT, CORPS OF ENGINEERS
SACRAMENTO, CALIFORNIA

SUBMITTED: MICHAEL D. RAMSBOTHAM

APPROVED: RESIDENT ENGINEER

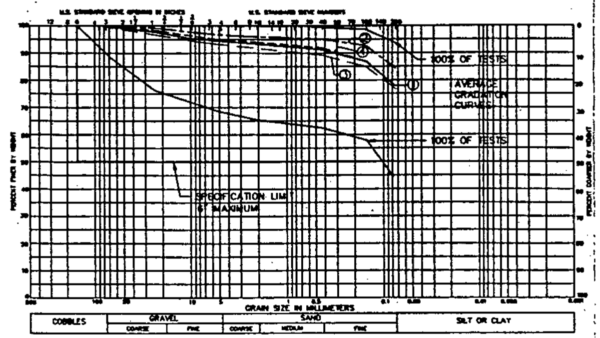
GEB MDR

PLATE 28



PLASTICITY CHART

NOTE: X REPRESENTS ALL TEST DATA FOR 1990, 1991 AND 1992.

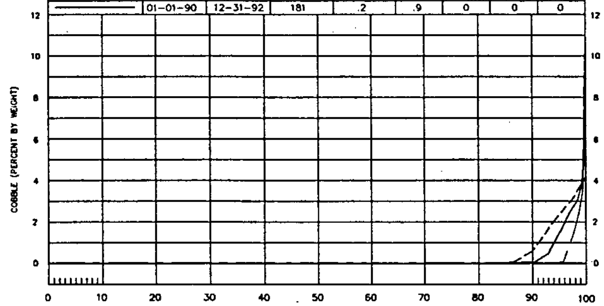


GRADATION CURVES

LEGEND

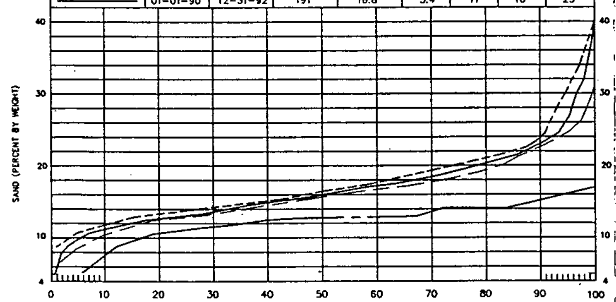
④ - - - - - 1992
③ — — — 1991
② — - — 1990
① ——— 1990, 1991, & 1992
STD DEV STANDARD DEVIATION

YEAR	FROM	TO	# TESTS	MEAN	STD DEV	≤ 10%	MEDIAN	≥ 90%
- - - - -	01-01-92	12-31-92	103	.2	.8	0	0	0
— — —	01-01-91	12-31-91	70	.2	1.2	0	0	0
— - —	01-01-90	12-31-90	18	0	0	0	0	0
———	01-01-90	12-31-92	181	.2	.9	0	0	0



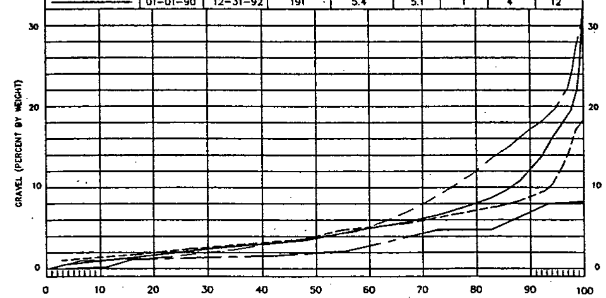
COBBLE – S-CURVE

YEAR	FROM	TO	# TESTS	MEAN	STD DEV	≤ 10%	MEDIAN	≥ 90%
- - - - -	01-01-92	12-31-92	103	17.9	5.8	12	16	24
— — —	01-01-91	12-31-91	70	18.3	4.7	10	16	22.5
— - —	01-01-90	12-31-90	18	12.5	2.7	5	13	15
———	01-01-90	12-31-92	191	16.8	5.4	11	16	23



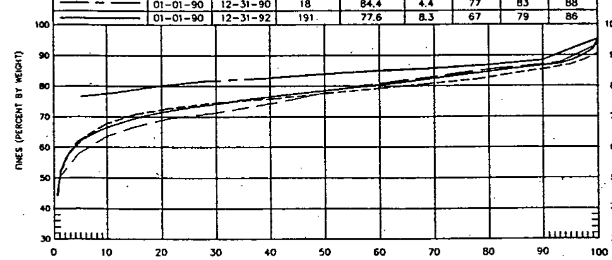
SAND – S-CURVE

YEAR	FROM	TO	# TESTS	MEAN	STD DEV	≤ 10%	MEDIAN	≥ 90%
- - - - -	01-01-92	12-31-92	103	4.8	3.6	1	4	9
— - —	01-01-91	12-31-91	70	6.9	6.9	1	4	16
— — —	01-01-90	12-31-90	18	3.1	2.6	0	2	7
———	01-01-90	12-31-92	191	5.4	5.1	1	4	12



GRAVEL – S-CURVE

YEAR	FROM	TO	# TESTS	MEAN	STD DEV	≤ 10%	MEDIAN	≥ 90%
- - - - -	01-01-92	12-31-92	103	77.1	7.4	68	78	85
— — —	01-01-91	12-31-91	70	76.7	9.5	64	77	87
— - —	01-01-90	12-31-90	18	84.4	4.4	77	83	88
———	01-01-90	12-31-92	191	77.6	8.3	67	79	86



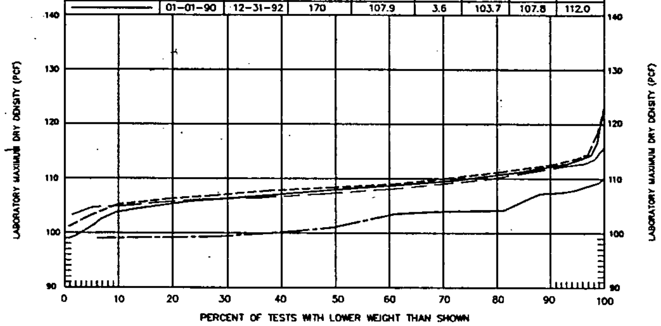
FINES – S-CURVE

LITTLE DELL LAKE
SALT LAKE CITY STREAMS, UTAH
EMBANKMENT
IMPERVIOUS CORE CLASSIFICATION TEST RESULTS

DEPARTMENT OF THE ARMY
SACRAMENTO DISTRICT, CORPS OF ENGINEERS
SACRAMENTO, CALIFORNIA

SUBMITTED: MICHAEL D. RAMSBOTHAM	APPROVED: RESIDENT ENGINEER
GEB / MDR	PLATE 29

YEAR	FROM	TO	# TESTS	MEAN	STD DEV	≤ 10%	MEDIAN	≥ 90%
- - - - - - - -	01-01-92	12-31-92	100	106.7	3.4	105.1	108.4	112.4
— — — —	01-01-91	12-31-91	54	108.0	2.8	104.9	107.4	111.7
—— - ——	01-01-90	12-31-90	16	102.5	3.3	99.0	100.9	107.1
————	01-01-90	12-31-92	170	107.9	3.6	103.7	107.8	112.0

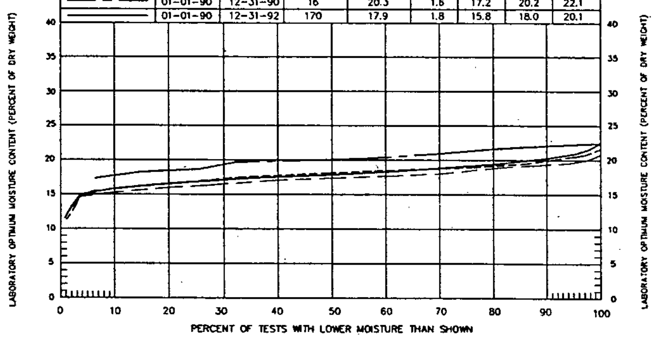


LABORATORY MAXIMUM DRY DENSITY – S-CURVE

NOTE:

1. REFERENCE EM 1110-2-1906 AND ASTM D 698, STANDARD EFFORT

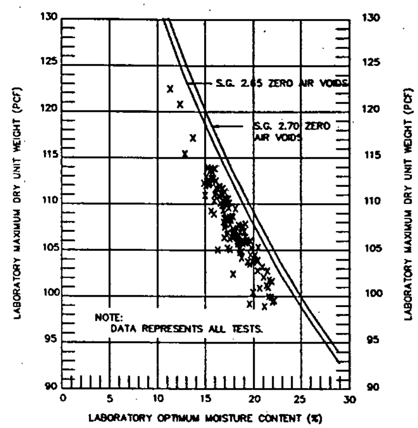
YEAR	FROM	TO	# TESTS	MEAN	STD DEV	≤ 10%	MEDIAN	≥ 90%
- - - - - - - -	01-01-92	12-31-92	100	17.9	1.7	15.8	18.0	19.9
— — — —	01-01-91	12-31-91	54	17.4	1.5	15.0	17.4	18.9
—— - ——	01-01-90	12-31-90	16	20.3	1.6	17.2	20.2	22.1
————	01-01-90	12-31-92	170	17.9	1.8	15.8	18.0	20.1



LABORATORY OPTIMUM MOISTURE CONTENT – S-CURVE

NOTE:

1. REFERENCE EM 1110-2-1906 AND ASTM D 698, STANDARD EFFORT



OPTIMUM MOISTURE VS. MAXIMUM DRY DENSITY

NOTE: AVERAGE SPECIFIC GRAVITY = 2.6

LEGEND

④ - - - - - - - - 1992
③ — — — — 1991
② —— - —— 1990
① ———— 1990, 1991, & 1992

PCF = POUNDS PER CUBIC FOOT
SG = SPECIFIC GRAVITY
STD DEV = STANDARD DEVIATION

LITTLE DELL LAKE
SALT LAKE CITY STREAMS, UTAH

EMBANKMENT

IMPERVIOUS CORE COMPACTION TEST RESULTS

DEPARTMENT OF THE ARMY
SACRAMENTO DISTRICT, CORPS OF ENGINEERS
SACRAMENTO, CALIFORNIA

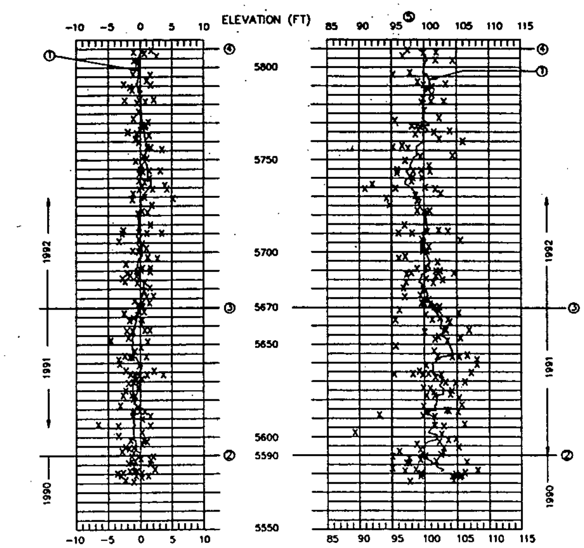
SUBMITTED:
MICHAEL D. RAMSBOTHAM

APPROVED:
RESIDENT ENGINEER

GEB | MDR

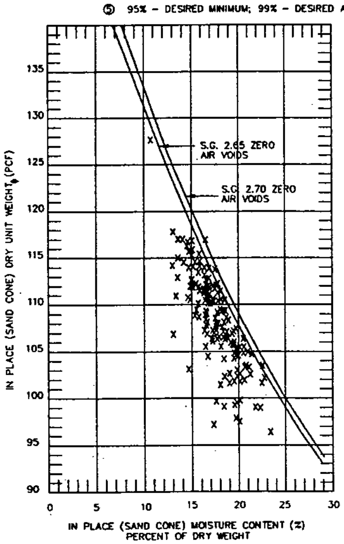
PLATE 30

1=1



NOTES:

1. CURVE REPRESENTS A RUNNING AVERAGE OF 10 TESTS
2. APPROXIMATE ELEVATION OF THE CORE AT THE END OF THE 1990 CONSTRUCTION SEASON
3. APPROXIMATE ELEVATION OF THE CORE AT THE END OF THE 1991 CONSTRUCTION SEASON
4. TOP OF CORE AT EL. 5810
5. 95% - DESIRED MINIMUM; 99% - DESIRED AVERAGE

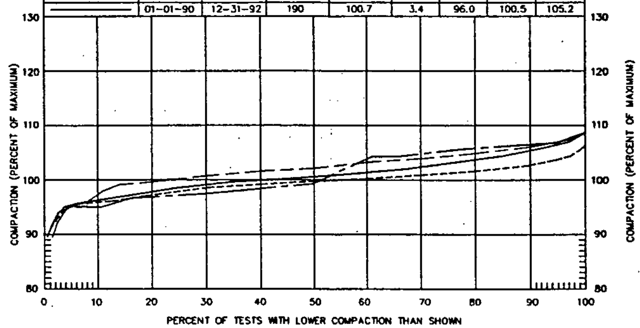


MOISTURE VS. DENSITY

NOTE:

1. DATA REPRESENTS ALL TESTS
2. REFERENCE ASTM D1556, DENSITY OF SOIL IN PLACE BY SAND CONE METHOD

YEAR	FROM	TO	# TESTS	MEAN	STD DEV	≤ 10%	MEDIAN	≥ 90%
----------	01-01-92	12-31-92	102	99.5	2.7	95.8	99.7	102.4
— — — —	01-01-91	12-31-91	70	102.1	3.5	97.7	102.4	105.7
—— — ——	01-01-90	12-31-90	18	101.5	4.4	95.1	99.3	106.4
————	01-01-90	12-31-92	190	100.7	3.4	96.0	100.5	105.2

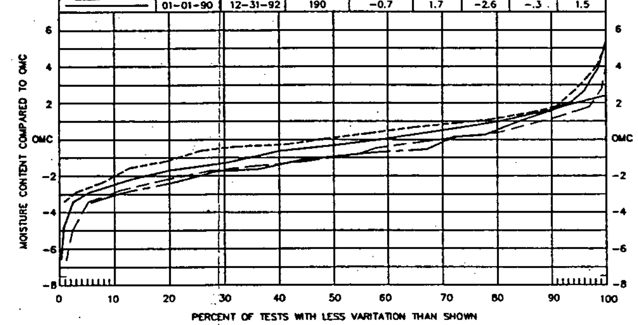


IN PLACE COMPACTION – S-CURVE

NOTES:

1. REFERENCE EM 1110-2-1906 AND ASTM D698, STANDARD EFFORT
2. REFERENCE ASTM D 1556, DENSITY OF SOIL IN PLACE BY SAND CONE METHOD

YEAR	FROM	TO	# TESTS	MEAN	STD DEV	≤ 10%	MEDIAN	≥ 90%
----------	01-01-92	12-31-92	102	0.2	1.6	-2.0	0	1.7
— — — —	01-01-91	12-31-91	70	-0.9	1.7	-3.1	-1	1.1
—— — ——	01-01-90	12-31-90	18	-0.7	1.7	-3.5	-1	1.6
————	01-01-90	12-31-92	190	-0.7	1.7	-2.6	-.3	1.5

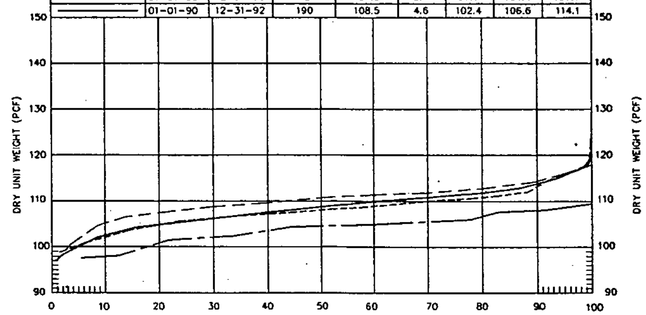


OMC COMPARISON – S-CURVES

NOTES:

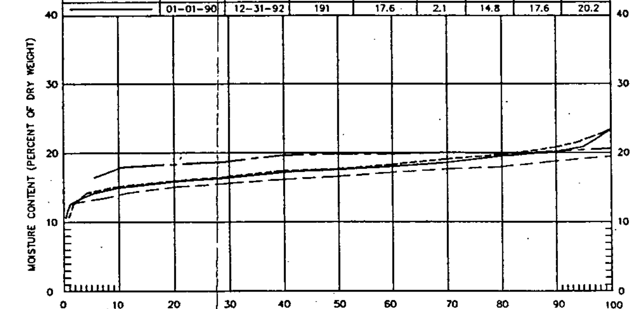
1. REFERENCE EM 1110-2-1906 AND ASTM D698, STANDARD EFFORT
2. REFERENCE ASTM D 1556, DENSITY OF SOIL IN PLACE BY SAND CONE METHOD

YEAR	FROM	TO	# TESTS	MEAN	STD DEV	≤ 10%	MEDIAN	≥ 90%
----------	01-01-92	12-31-92	102	108.2	4.6	102.4	108.2	113.6
— — — —	01-01-91	12-31-91	70	110.1	3.9	105.8	110.7	114.1
—— — ——	01-01-90	12-31-90	18	104.0	3.4	97.7	104.4	107.7
————	01-01-90	12-31-92	190	108.5	4.6	102.4	106.6	114.1



IN PLACE UNIT WEIGHT – S-CURVE

YEAR	FROM	TO	# TESTS	MEAN	STD DEV	≤ 10%	MEDIAN	≥ 90%
----------	01-01-92	12-31-92	103	18.0	2.3	15.1	17.8	20.8
— — — —	01-01-91	12-31-91	70	16.6	1.6	14.4	16.5	18.7
—— — ——	01-01-90	12-31-90	18	19.5	1.0	16.6	19.7	20.2
————	01-01-90	12-31-92	191	17.6	2.1	14.8	17.6	20.2



IN PLACE MOISTURE CONTENT – S-CURVE

LEGEND

4	----------	1992
3	— — — —	1991
2	—— — ——	1990
1	————	1990, 1991, & 1992

PCF = POUNDS PER CUBIC FOOT
OMC = OPTIMUM MOISTURE CONTENT
SG = SPECIFIC GRAVITY
STD DEV = STANDARD DEVIATION

LITTLE DELL LAKE
SALT LAKE CITY STREAMS, UTAH
EMBANKMENT
IMPERVIOUS CORE CONSTRUCTION PLACEMENT DATA

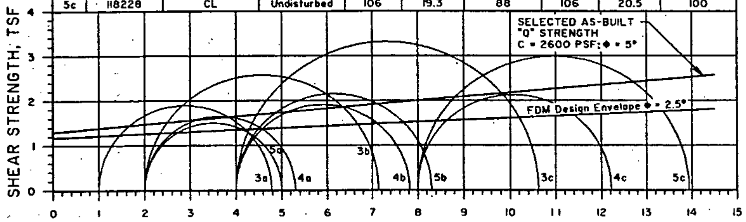
DEPARTMENT OF THE ARMY
SACRAMENTO DISTRICT, CORPS OF ENGINEERS
SACRAMENTO, CALIFORNIA

SUBMITTED: MICHAEL D. RAMSBOTHAM
APPROVED: [signature] RESIDENT ENGINEER

GEB | MDR

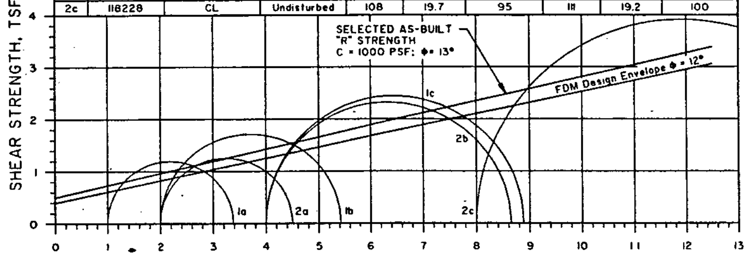
PLATE 31

NO.	DIVISION SAMPLE NO.	MATERIAL CLASS. SYMBOL	TYPE OF SAMPLE	PROPERTIES INITIAL DRY DENSITY (PCF)	INITIAL MOISTURE CONTENT (%)	INITIAL SATURATION (%)	BEFORE SHEAR DRY DENSITY (PCF)	BEFORE SHEAR MOISTURE CONTENT (%)	BEFORE SHEAR SATURATION (%)
3a	117945	CL	Undisturbed	110	18.1	91	110	18.1	91
3b	117946	CL	Undisturbed	111	17.3	88	111	17.3	88
3c	117947	CL	Undisturbed	115	16.1	93	115	16.1	93
4a	118229	CL	Undisturbed	108.5	19.0	96	109.6	19.0	98
4b	118229	CL	Undisturbed	110.2	18.4	97	111.5	18.4	100
4c	118229	CL	Undisturbed	109.8	18.2	94	111.7	19.0	100
5a	118226	CL	Undisturbed	106	18.5	77	106	18.5	100
5b	118227	CL	Undisturbed	110	18.3	93	110	18.1	100
5c	118228	CL	Undisturbed	106	19.3	88	106	20.5	100

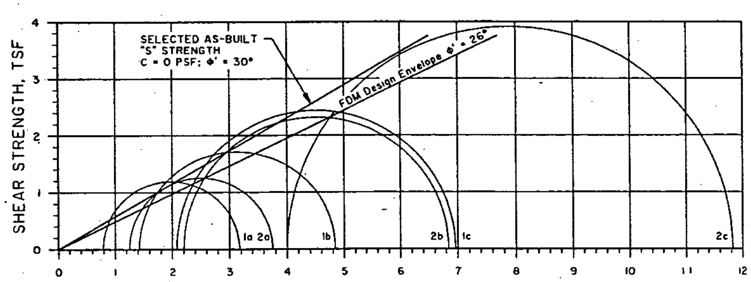


"Q" TRIAXIAL SHEAR STRENGTH (IMPERVIOUS FILL)

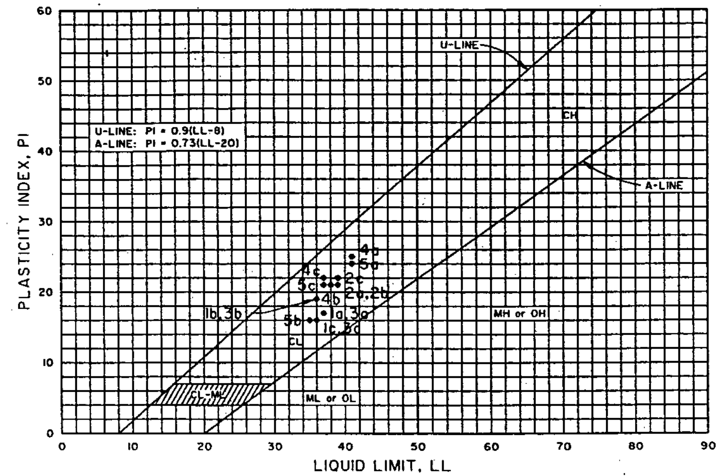
NO.	DIVISION SAMPLE NO.	MATERIAL CLASS. SYMBOL	TYPE OF SAMPLE	UNDISTURBED PROPERTIES INITIAL DRY DENSITY (PCF)	INITIAL MOISTURE CONTENT (%)	INITIAL SATURATION (%)	BEFORE SHEAR DRY DENSITY (PCF)	BEFORE SHEAR MOISTURE CONTENT (%)	BEFORE SHEAR SATURATION (%)
1a	117945	CL	Undisturbed	108	17.9	87	109	20.2	100
1b	117946	CL	Undisturbed	111	17.0	89	113	18.4	100
1c	117947	CL	Undisturbed	112	17.2	90	113	17.8	100
2a	118226	CL	Undisturbed	106	18.2	84	107	20.7	100
2b	118227	CL	Undisturbed	108	19.6	93	110	19.7	100
2c	118228	CL	Undisturbed	108	19.7	95	111	19.2	100



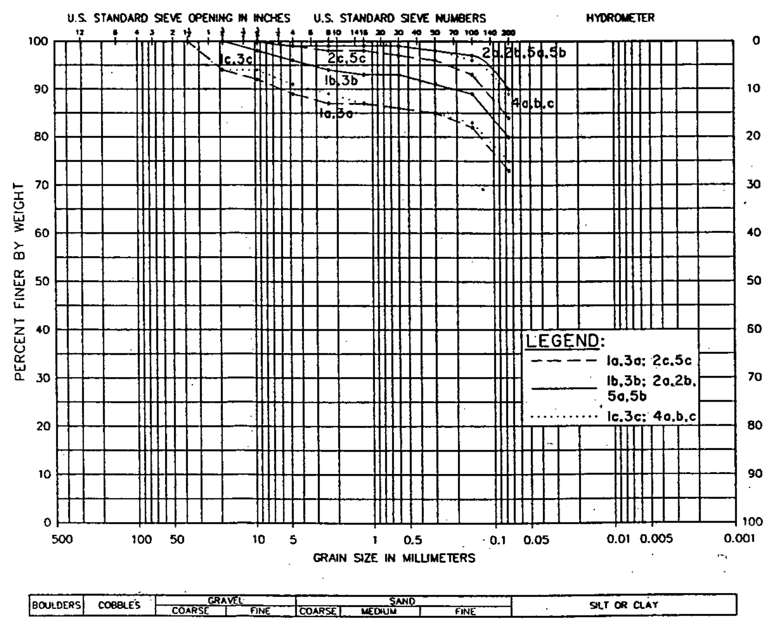
"$\overline{R}$" TRIAXIAL SHEAR STRENGTH (IMPERVIOUS FILL)



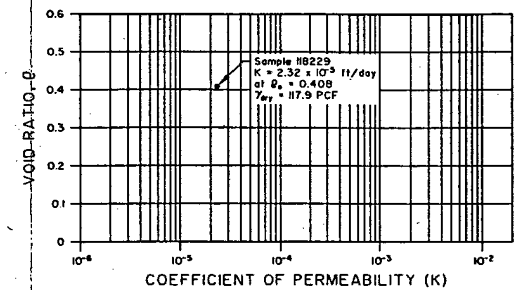
"S" TRIAXIAL SHEAR STRENGTH (IMPERVIOUS FILL)



ATTERBERG LIMITS (IMPERVIOUS FILL)

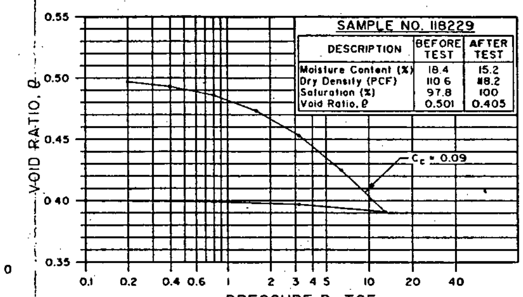


GRADATION CURVES (IMPERVIOUS FILL)



COEFFICIENT OF PERMEABILITY (K) AT 20° C. - FEET PER DAY

PERMEABILITY TEST DATA (IMPERVIOUS FILL)



SAMPLE NO. 118229 DESCRIPTION	BEFORE TEST	AFTER TEST
Moisture Content (%)	18.4	15.2
Dry Density (PCF)	110.6	118.2
Saturation (%)	97.8	100
Void Ratio, e	0.501	0.405

CONSOLIDATION TEST (IMPERVIOUS FILL)

RECORD SAMPLING DATA (IMPERVIOUS FILL)

DIVISION SAMPLE NO.	DATE OF SAMPLE	LOCATION STATION	ELEVATION (Feet)	OFFSET
117945	10-13 Aug 91	15+07	5625.0	0'
117946	10-13 Aug 91	15+07	5625.0	0'
117947	10-13 Aug 91	15+07	5625.0	0'
118226	30 Oct - 3 Nov 91	17+50	5670.2	0'
118227	30 Oct - 3 Nov 91	17+50	5670.2	0'
118228	30 Oct - 3 Nov 91	17+50	5670.2	0'
118229	30 Oct - 3 Nov 91	17+50	5670.2	0'

LITTLE DELL LAKE
SALT LAKE CITY STREAMS, UTAH

IMPERVIOUS CORE
RECORD TEST RESULTS

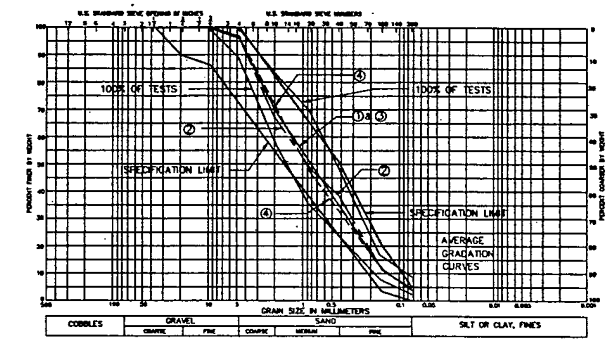
DEPARTMENT OF THE ARMY
SACRAMENTO DISTRICT, CORPS OF ENGINEERS
SACRAMENTO, CALIFORNIA

SUBMITTED: DAVE RICKETTS

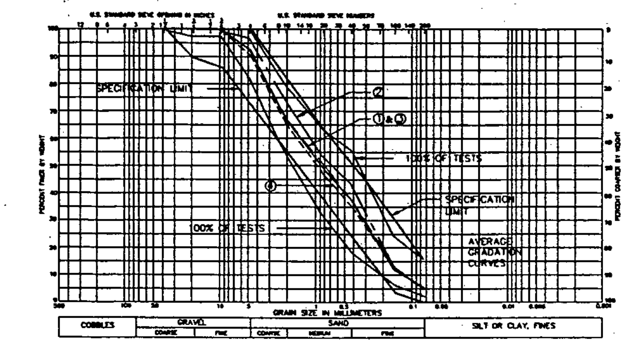
SUBMITTED: RESIDENT ENGINEER

N. BOLAND | D. R.

PLATE 32



GRADATION CURVES
TRANSITION I

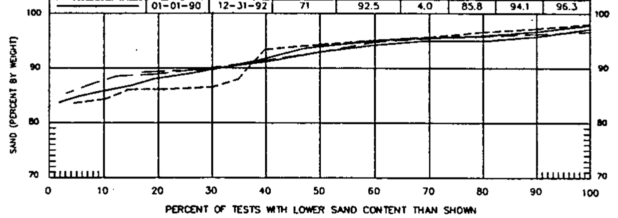


GRADATION CURVES
TRANSITION II

LEGEND

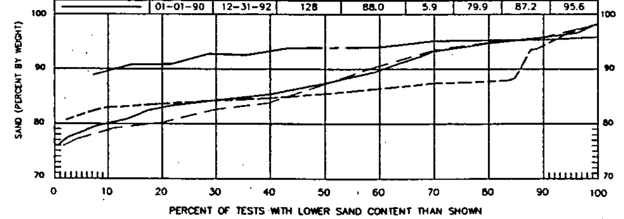
④ ——————— 1992
③ — — — — 1991
② ——— — ——— 1990
① ——————— 1990, 1991, & 1992
STD DEV STANDARD DEVIATION

YEAR	FROM	TO	# TESTS	MEAN	STD DEV	≤ 10%	MEDIAN	≥ 90%
- - - - - - -	01-01-92	12-31-92	28	92.2	5.1	83.9	94.3	97.3
— — — —	01-01-91	12-31-91	37	92.5	3.2	87.8	92.7	95.9
——— — ———	01-01-90	12-31-90	6	93.2	3.1	0	90	95
———————	01-01-90	12-31-92	71	92.5	4.0	85.8	94.1	96.3



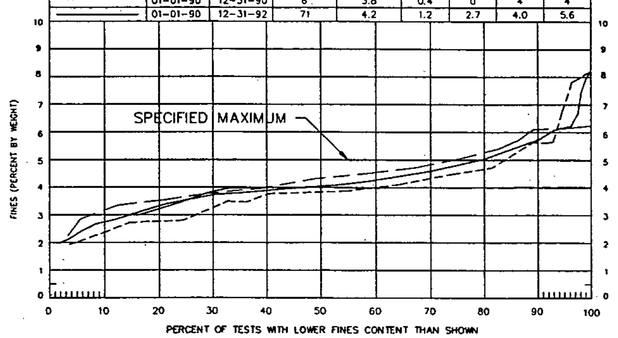
SAND – S-CURVE
TRANSITION I

YEAR	FROM	TO	# TESTS	MEAN	STD DEV	≤ 10%	MEDIAN	≥ 90%
- - - - - - -	01-01-92	12-31-92	40	86.8	4.2	83.2	86.5	94.2
— — — —	01-01-91	12-31-91	72	87.7	6.6	78.6	86.4	95.6
——— — ———	01-01-90	12-31-90	14	93.5	1.9	89	94	95
———————	01-01-90	12-31-92	128	88.0	5.9	79.9	87.2	95.6



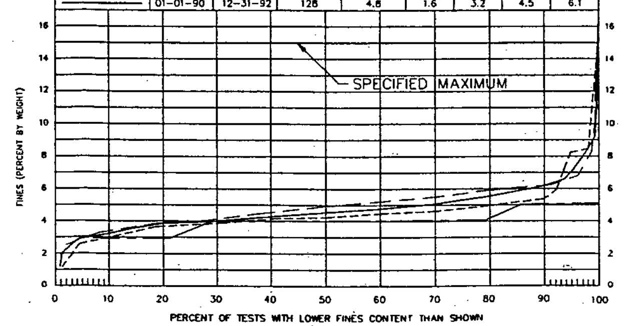
SAND – S-CURVE
TRANSITION II

YEAR	FROM	TO	# TESTS	MEAN	STD DEV	≤ 10%	MEDIAN	≥ 90%
- - - - - - -	01-01-92	12-31-92	28	4.0	1.5	2.1	3.7	5.6
— — — —	01-01-91	12-31-91	37	4.4	1.0	2.9	4.3	6.1
——— — ———	01-01-90	12-31-90	6	3.8	0.4	0	4	4
———————	01-01-90	12-31-92	71	4.2	1.2	2.7	4.0	5.6



FINES – S-CURVE
TRANSITION I

YEAR	FROM	TO	# TESTS	MEAN	STD DEV	≤ 10%	MEDIAN	≥ 90%
- - - - - - -	01-01-92	12-31-92	40	4.6	1.3	3.2	4.3	5.2
— — — —	01-01-91	12-31-91	72	5.0	1.7	3.4	4.8	6.2
——— — ———	01-01-90	12-31-90	14	4.0	0.7	3	4	5
———————	01-01-90	12-31-92	128	4.8	1.6	3.2	4.5	6.1



FINES – S-CURVE
TRANSITION II

LITTLE DELL LAKE
SALT LAKE CITY STREAMS, UTAH
EMBANKMENT
TRANSITION I AND II
CLASSIFICATION TEST RESULTS

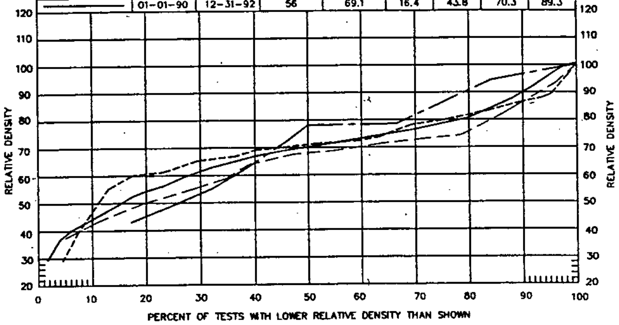
DEPARTMENT OF THE ARMY
SACRAMENTO DISTRICT, CORPS OF ENGINEERS
SACRAMENTO, CALIFORNIA

SUBMITTED: MICHAEL D. RAMSBOTHAM
APPROVED: RESIDENT ENGINEER

GEB MDR

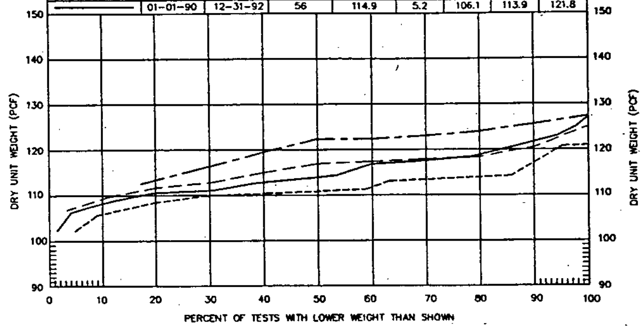
PLATE 33

YEAR	FROM	TO	# TESTS	MEAN	STD DEV	≤ 10%	MEDIAN	≥ 90%
- - - - - -	01-01-92	12-31-92	22	71.0	15.3	44.9	70.4	85.3
— — — —	01-01-91	12-31-91	28	66.3	16.1	38.2	67.8	84.8
—— - ——	01-01-90	12-31-90	6	74.9	21.9	0	56.3	93.7
————	01-01-90	12-31-92	56	69.1	16.4	43.8	70.3	89.3



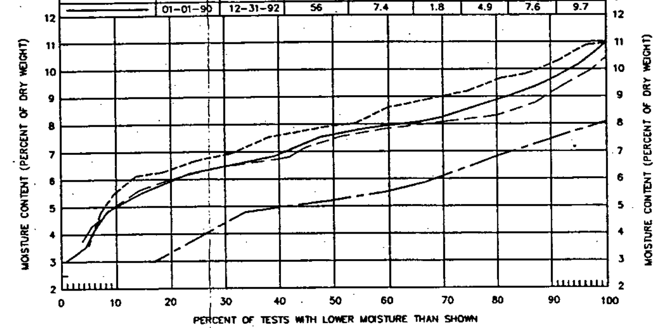
RELATIVE DENSITY – S-CURVE
TRANSITION I

YEAR	FROM	TO	# TESTS	MEAN	STD DEV	≤ 10%	MEDIAN	≥ 90%
- - - - - -	01-01-92	12-31-92	22	111.8	4.3	105.9	111.1	114.3
— — — —	01-01-91	12-31-91	28	116.0	4.3	108.2	116.7	120.0
—— - ——	01-01-90	12-31-90	6	121.1	5.4	0	117.7	124.5
————	01-01-90	12-31-92	56	114.9	5.2	106.1	113.9	121.8



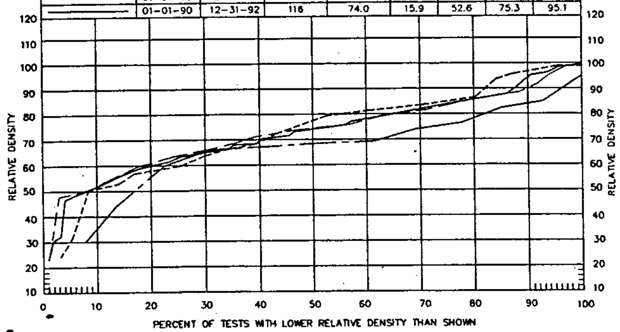
IN PLACE UNIT WEIGHT – S-CURVE
TRANSITION I

YEAR	FROM	TO	# TESTS	MEAN	STD DEV	≤ 10%	MEDIAN	≥ 90%
- - - - - -	01-01-92	12-31-92	22	8.0	1.8	5.5	7.9	9.8
— — — —	01-01-91	12-31-91	28	7.3	1.6	4.9	7.5	9.1
—— - ——	01-01-90	12-31-90	6	5.7	1.8	0	4.8	7.1
————	01-01-90	12-31-92	56	7.4	1.8	4.9	7.6	9.7



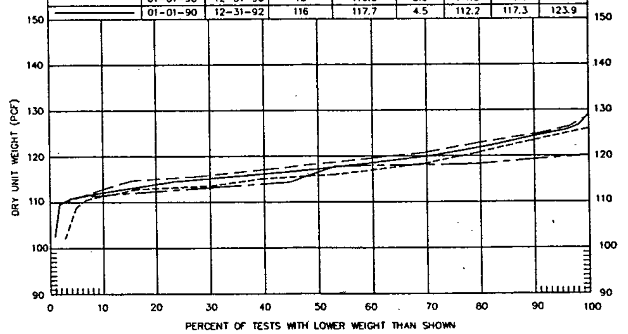
IN PLACE MOISTURE CONTENT – S-CURVE
TRANSITION I

YEAR	FROM	TO	# TESTS	MEAN	STD DEV	≤ 10%	MEDIAN	≥ 90%
- - - - - -	01-01-92	12-31-92	36	74.9	18.6	51.7	78.6	97.3
— — — —	01-01-91	12-31-91	67	74.4	14.3	53.5	75.3	90.8
—— - ——	01-01-90	12-31-90	13	69.3	16.5	30.4	69.4	83.0
————	01-01-90	12-31-92	116	74.0	15.9	52.6	75.3	95.1



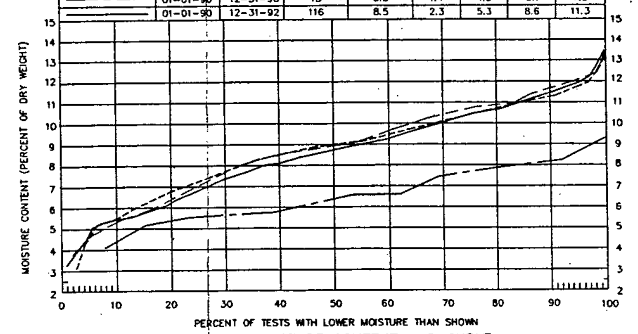
RELATIVE DENSITY – S-CURVE
TRANSITION II

YEAR	FROM	TO	# TESTS	MEAN	STD DEV	≤ 10%	MEDIAN	≥ 90%
- - - - - -	01-01-92	12-31-92	36	116.6	4.9	110.9	115.3	123.0
— — — —	01-01-91	12-31-91	67	118.7	4.4	112.4	118.4	124.8
—— - ——	01-01-90	12-31-90	13	116.0	3.0	111.3	115.0	118.5
————	01-01-90	12-31-92	116	117.7	4.5	112.2	117.3	123.9



IN PLACE UNIT WEIGHT – S-CURVE
TRANSITION II

YEAR	FROM	TO	# TESTS	MEAN	STD DEV	≤ 10%	MEDIAN	≥ 90%
- - - - - -	01-01-92	12-31-92	36	8.7	2.2	5.3	8.8	11.2
— — — —	01-01-91	12-31-91	67	8.7	2.3	5.4	8.7	11.5
—— - ——	01-01-90	12-31-90	13	6.6	1.4	4.0	6.1	7.9
————	01-01-90	12-31-92	116	8.5	2.3	5.3	8.6	11.3



IN PLACE MOISTURE CONTENT – S-CURVE
TRANSITION II

LEGEND

④ - - - - - - 1992
③ — — — — 1991
② —— - —— 1990
① ———— 1990, 1991, & 1992

PCF = POUNDS PER CUBIC FOOT
STD DEV = STANDARD DEVIATION

LITTLE DELL LAKE
SALT LAKE CITY STREAMS, UTAH

EMBANKMENT
TRANSITION I AND TRANSITION II
CONSTRUCTION PLACEMENT DATA

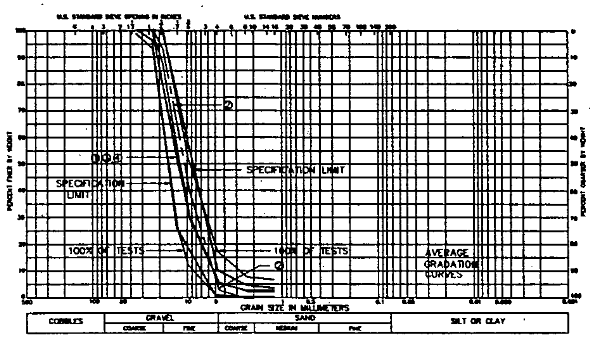
DEPARTMENT OF THE ARMY
SACRAMENTO DISTRICT, CORPS OF ENGINEERS
SACRAMENTO, CALIFORNIA

SUBMITTED: MICHAEL D. RAMSBOTHAM
APPROVED: RESIDENT ENGINEER

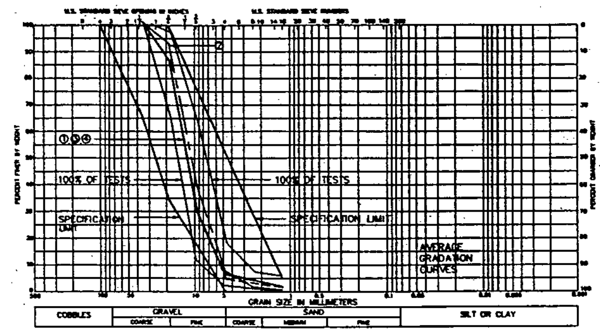
CEB | MDR

PLATE 34

LITTLE DELL PROJECT: PL-34 24 MAY 94 NLB

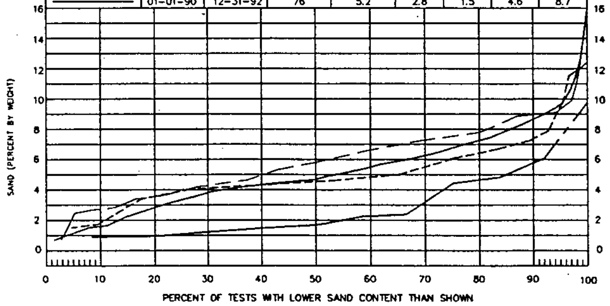


GRADATION CURVES
DRAINAGE FILL I



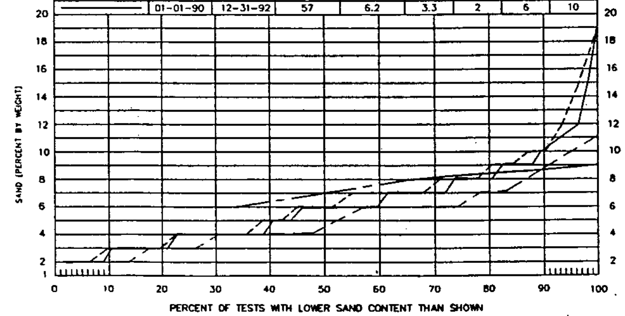
GRADATION CURVES
DRAINAGE FILL II

YEAR	FROM	TO	# TESTS	MEAN	STD DEV	≤ 10%	MEDIAN	≥ 90%
- - - - - -	01-01-92	12-31-92	27	5.1	2.4	1.6	4.4	7.1
— — —	01-01-91	12-31-91	37	5.9	2.7	2.7	5.5	8.8
— - —	01-01-90	12-31-90	12	3.1	2.7	0.9	1.5	4.7
———	01-01-90	12-31-92	76	5.2	2.8	1.5	4.6	8.7



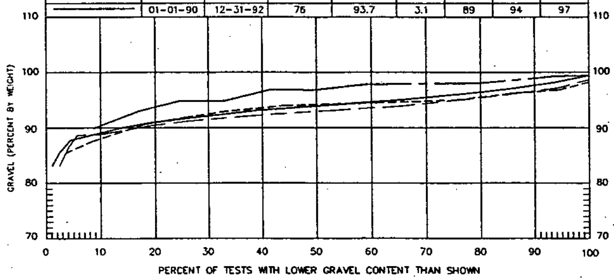
SAND – S-CURVE
DRAINAGE FILL I

YEAR	FROM	TO	# TESTS	MEAN	STD DEV	≤ 10%	MEDIAN	≥ 90%
- - - - - -	01-01-92	12-31-92	31	6.6	3.8	3	6	10
— — —	01-01-91	12-31-91	23	5.3	2.5	2	4	8
— - —	01-01-90	12-31-90	3	7.7	1.5	0	8	8
———	01-01-90	12-31-92	57	6.2	3.3	2	6	10



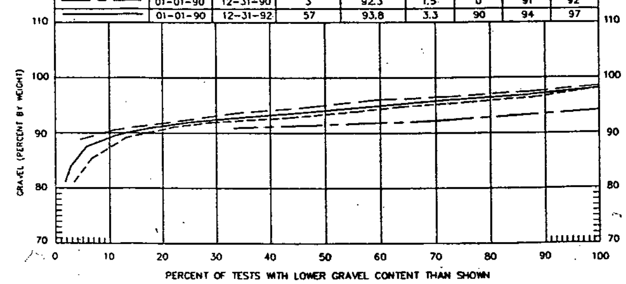
SAND – S-CURVE
DRAINAGE FILL II

YEAR	FROM	TO	# TESTS	MEAN	STD DEV	≤ 10%	MEDIAN	≥ 90%
- - - - - -	01-01-92	12-31-92	27	93.5	2.8	88	94	96
— — —	01-01-91	12-31-91	37	92.9	3.1	89	93	96
— - —	01-01-90	12-31-90	12	95.4	2.7	90	97	98
———	01-01-90	12-31-92	76	93.7	3.1	89	94	97



GRAVEL – S-CURVE
DRAINAGE FILL I

YEAR	FROM	TO	# TESTS	MEAN	STD DEV	≤ 10%	MEDIAN	≥ 90%
- - - - - -	01-01-92	12-31-92	31	93.3	3.8	88	93	97
— — —	01-01-91	12-31-91	23	94.7	2.5	90	94	97
— - —	01-01-90	12-31-90	3	92.3	1.5	0	91	92
———	01-01-90	12-31-92	57	93.8	3.3	90	94	97



GRAVEL – S-CURVE
DRAINAGE FILL II

LEGEND

④	- - - - - -	1992
③	— — —	1991
②	— - —	1990
①	———	1990, 1991, & 1992
	STD DEV	STANDARD DEVIATION

LITTLE DELL LAKE
SALT LAKE CITY STREAMS, UTAH
EMBANKMENT
DRAINAGE FILL I AND II
CLASSIFICATION TEST RESULTS

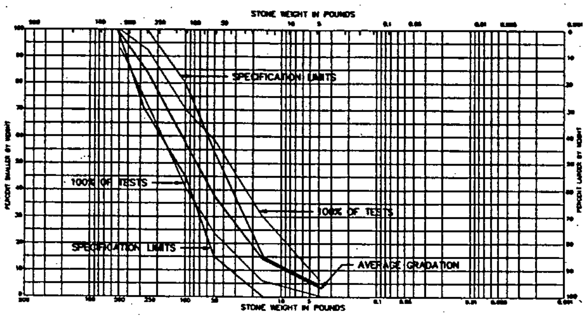
DEPARTMENT OF THE ARMY
SACRAMENTO DISTRICT, CORPS OF ENGINEERS
SACRAMENTO, CALIFORNIA

SUBMITTED:
MICHAEL D. RAMSBOTHAM

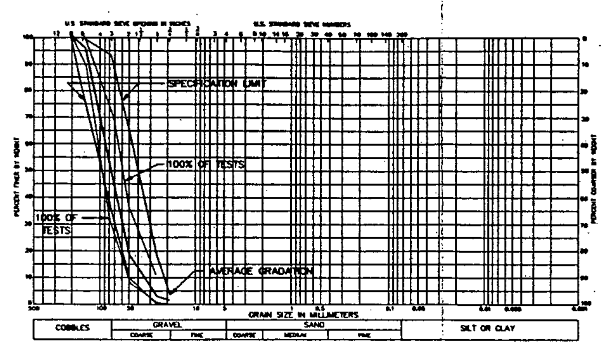
APPROVED:
RESIDENT ENGINEER

DR BY: GEB
CHECKED BY: MDR

PLATE 35



RIPRAP I – GRADATION CURVES



RIPRAP I BEDDING – GRADATION CURVES

TEST	TEST METHOD	RIPRAP I & BEDDING REQUIREMENTS	PEOA QUARRY PRE-BID STUDY	PEOA QUARRY AUG 92 SAMPLE	PEOA QUARRY AUG 92 SAMPLE	LITTLE DELL BORROW AREA JUNE 1990 SAMPLES	
						QUARTZITE	SANDSTONE
SPECIFIC GRAVITY (BULK SSD)	ASTM C127	2.4 MINIMUM	2.62	2.53	--	2.59	2.54
ABSORPTION	ASTM C127	5.0% MAXIMUM	1.8%	2.0%	--	0.12%	0.66%
WETTING AND DRYING	SPD TEST PROCEDURE (NOTE 1)	NO FRACTURING (NOTE 2)	PASSED	PASSED	--	PASSED	FAILED
ABRASION LOSS	ASTM C535	50% MAXIMUM	25.6%	46.0%	24.0%	10.8%	10.8%
MAGNESIUM SULFATE	ASTM C88	25% MAXIMUM	9.0%	30.2%	--	0.7%	0.7%
FREEZE/THAW	CRD C144	(NOTE 3)	PASSED	FAILED	PASSED	PASSED	PASSED

NOTES:

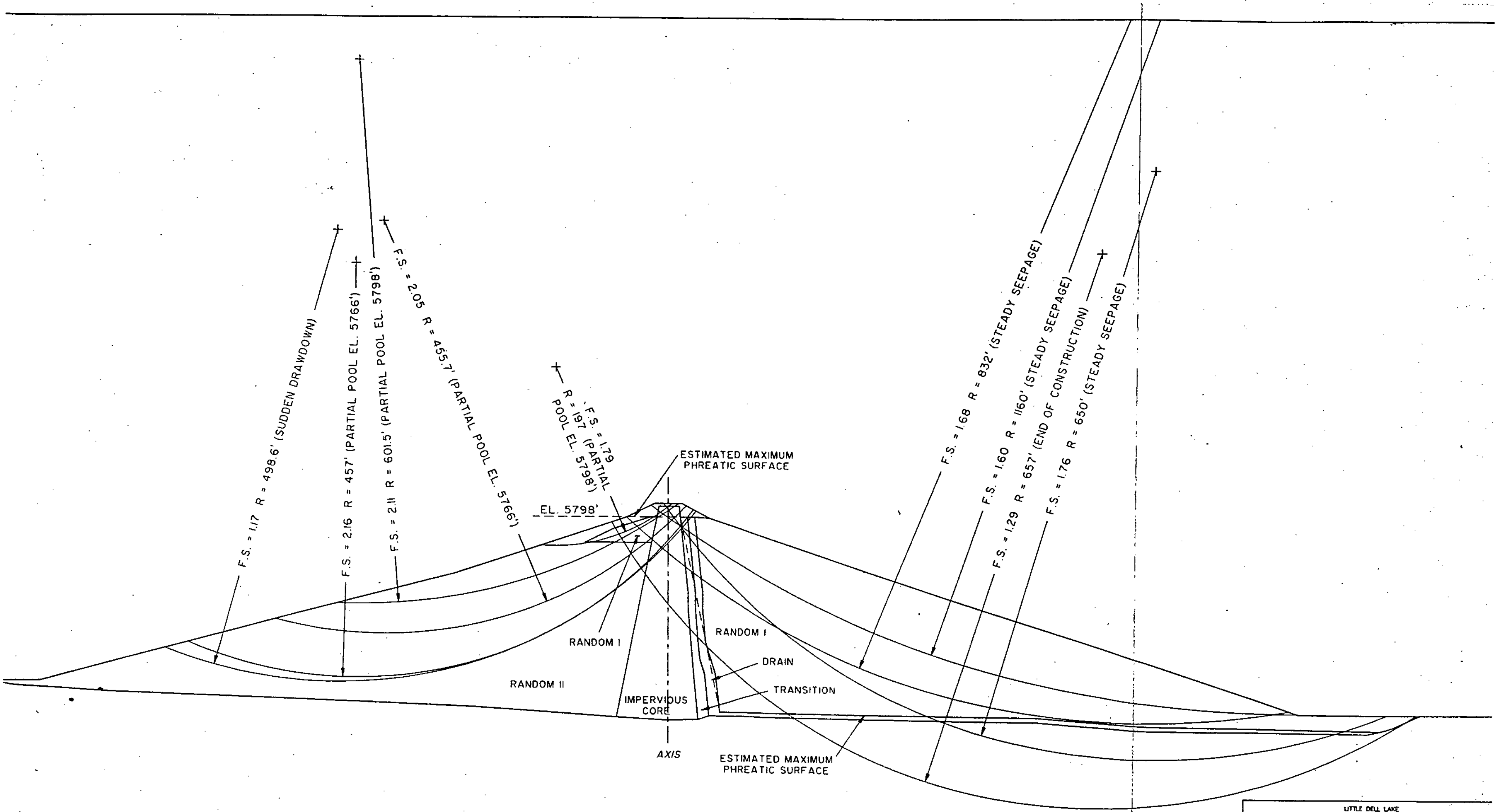
1. TEST PROCEDURE WETTING-AND-DRYING TESTS: THE INITIAL STEP OF THE TEST IS THE CAREFUL EXAMINATION OF THE ENTIRE SAMPLE AND SELECTION OF REPRESENTATIVE TEST SPECIMENS. THE PIECE SHOULD BE LARGE ENOUGH TO PRODUCE TWO CUT SLABS 1 INCH THICK (± 1/4") WITH A MINIMUM SURFACE AREA OF 30 SQUARE INCHES ON ONE SIDE. TWO CHUNKS APPROXIMATELY THREE BY FOUR INCHES ARE ALSO CHOSEN. THE SLABS AND CHUNKS ARE CAREFULLY EXAMINED UNDER A LOW-POWER MICROSCOPE, AND ALL VISIBLE SURFACE FEATURES ARE NOTED AND RECORDED. THE SPECIMENS ARE THEN OVEN DRIED AT 140 DEGREES F., FOR EIGHT HOURS, COOLED AND WEIGHED TO THE NEAREST TENTH OF A GRAM. THE TEST SPECIMENS ARE PHOTOGRAPHED TO SHOW ALL SURFACE FEATURES BEFORE THE TEST. THE CHUNKS AND SLABS ARE THEN SUBJECTED TO FIFTEEN CYCLES OF WETTING AND DRYING. ONE SLAB AND ONE CHUNK ARE SOAKED IN FRESH TAP WATER, AND THE OTHER SLAB AND CHUNK ARE SOAKED IN SALT WATER PREPARED IN ACCORDANCE WITH ASTM D 1141. EACH CYCLE CONSISTS OF SOAKING FOR SIXTEEN HOURS AT ROOM TEMPERATURE AND DRYING IN AN OVEN FOR EIGHT HOURS AT 140 DEGREES F. AFTER EACH CYCLE THE SPECIMENS ARE EXAMINED WITH THE LOW-POWER MICROSCOPE TO CHECK FOR OPENING OR MOVEMENT OF FRACTURES, FLAKING ALONG EDGES, SWELLING OF CLAYS, SOFTENING OF ROCK SURFACES, HEAVING OF MICACEOUS MINERALS, THE BREAKDOWN OF MATRIX MATERIAL, DELAMINATION AND ANY OTHER EVIDENCE OF WEAKNESS DEVELOPING IN THE ROCK CYCLE IN WHICH ANY OF THESE ACTIONS OCCURS IS RECORDED. AFTER FIFTEEN CYCLES THE SLABS AND CHUNKS ARE AGAIN CAREFULLY EXAMINED, AND CHANGES IN ROCKS ARE NOTED AND RECORDED. THE TEST SPECIMENS TOGETHER WITH ALL FLAKES OR PARTICLES WHICH COME OFF DURING THE TEST ARE OVEN DRIED, WEIGHED AND PHOTOGRAPHED.
2. WEAKENING AND MINOR LOSS OF INDIVIDUAL SURFACE PARTICLES ARE PERMISSIBLE UNLESS BOND OF THE SURFACE GRAINS SOFTENS AND CAUSES GENERAL DISINTEGRATION OF THE MATERIAL.
3. RESULTS OF THIS TEST WILL BE USED AS A BASIS TO DISQUALIFY THE MATERIAL ONLY IF A SIGNIFICANT BREAKDOWN, DISINTEGRATION OR SPALLING OF THE MATERIAL OCCURS.

LITTLE DELL LAKE
SALT LAKE CITY STREAMS, UTAH
EMBANKMENT
RIPRAP I AND BEDDING TEST RESULTS

DEPARTMENT OF THE ARMY
SACRAMENTO DISTRICT, CORPS OF ENGINEERS
SACRAMENTO, CALIFORNIA

SUBMITTED: MICHAEL D. RAMSBOTHAM
APPROVED: RESIDENT ENGINEER
GEB MDR

PLATE 36



LITTLE DELL LAKE
SALT LAKE CITY STREAMS, UTAH

STABILITY ANALYSIS RESULTS
MAXIMUM VALLEY SECTION – STA. 14+50

DEPARTMENT OF THE ARMY
SACRAMENTO DISTRICT, CORPS OF ENGINEERS
SACRAMENTO, CALIFORNIA

SUBMITTED: DAVE RICKETTS

SUBMITTED: RESIDENT ENGINEER

R. BRADLEY | D. R.

PLATE 37

SLICE NO.	SEGMENT NO.	SEGMENT AREA (sq. ft.)	SOIL UNIT WEIGHT (pcf)			SEGMENT WEIGHT (kips)			SLICE WEIGHT (kips)	
			MOIST	SATURATED	SUBMERGED	MOIST	SATURATED	SUBMERGED	Before Drawdown	After Drawdown
1	1	16.5	137	–	–	2.3	–	–	2.3	2.3
2	2a	27.4	130	–	–	3.6	–	–	12.3	12.3
	2b	63.7	137	–	–	8.7	–	–		
3	3a	83.5	–	136	73.6	–	11.4	6.1	19.3	24.6
	3b	3.5	130	–	–	0.4	–	–		
	3c	93.7	137	–	–	12.8	–	–		
4	4a	1068.8	–	130	67.6	–	138.9	72.2	168.7	255.2
	4b	283.2	128	–	–	36.2	–	–		
	4c	14.0	–	136	73.6	–	1.9	1.0		
	4d	273.4	137	–	–	37.5	–	–		
	4e	1.8	–	140	77.6	–	0.3	0.1		
	4f	228.8	–	133	70.6	–	30.4	16.2		
	4g	71.4	–	140	77.6	–	10.0	5.5		
5	5a	3644.9	–	140	77.6	–	510.3	282.8	411.6	735.2
	5b	1000.7	–	133	70.6	–	133.1	70.7		
	5c	541.0	–	140	77.6	–	75.7	42.0		
	5d	117.3	137	–	–	16.1	–	–		
6	6	4081.4	–	140	77.6	–	571.4	316.7	316.7	571.4
7	7a	1458.0	–	–	77.6	–	–	113.1	667.9	1114.1
	7b	7149.9	–	140	77.6	–	1001.0	554.8		
8	8a	3481.1	–	–	77.6	–	–	270.1	660.0	973.5
	8b	5024.3	–	140	77.6	–	703.4	389.9		
9	9a	4294.6	–	–	77.6	–	–	333.3	581.8	781.7
	9b	3202.6	–	140	77.6	–	448.4	248.5		
10	10a	3971.9	–	–	77.6	–	–	308.2	416.2	503.1
	10b	1391.9	–	140	77.6	–	194.9	108.0		
11	11a	2000.3	–	–	77.6	–	–	155.2	160.3	164.3
	11b	65.4	–	140	77.6	–	9.1	5.1		

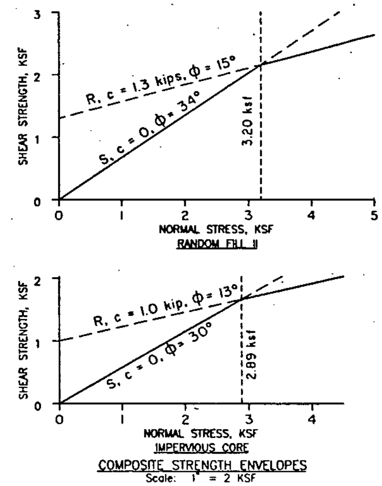
Computation of Factor of Safety – Sudden Drawdown

$$F.S. = \frac{\Sigma (N_D \tan\phi + c\,\Delta L)}{\Sigma W \sin\theta}$$

Where: N_D = Normal Effective Force Before Drawdown
W = Slice Weight After Drawdown

Slice	N_D (kips)	tan φ	N_D tan φ	Base Length ΔL (ft.)	c ΔL (kips)	W (kips)	θ (deg.)	sin θ	W sin θ (kips)
1	2.2	0.675	1.5	6.9	0	2.3	51.1	0.778	1.8
2	11.5	0.727	8.4	10.5	0	12.3	50.1	0.767	9.4
3	18.4	0.625	11.5	10.9	0	24.6	48.9	0.754	18.5
4	160.5	0.231	37.1	54.3	54.3	255.2	45.2	0.710	181.1
5	383.5	0.268	102.8	85.0	110.5	735.2	37.2	0.605	444.5
6	296.1	0.268	79.3	48.8	63.5	571.4	29.5	0.492	281.4
7	631.4	0.2687	169.2	88.7	115.3	1114.1	21.6	0.368	410.1
8	647.0	0.268	173.4	84.2	109.5	973.5	11.6	0.201	195.7
9	609.5	0.268	163.3	82.5	107.3	781.7	2.0	0.035	27.3
10	487.5	0.268	130.6	83.2	108.2	503.1	-7.5	-0.131	-65.7
11	235.7	0.675	159.0	86.4	0	164.3	-17.2	-0.296	-48.6
		Total:	1036.1	Total:	668.6			Total:	1455.5

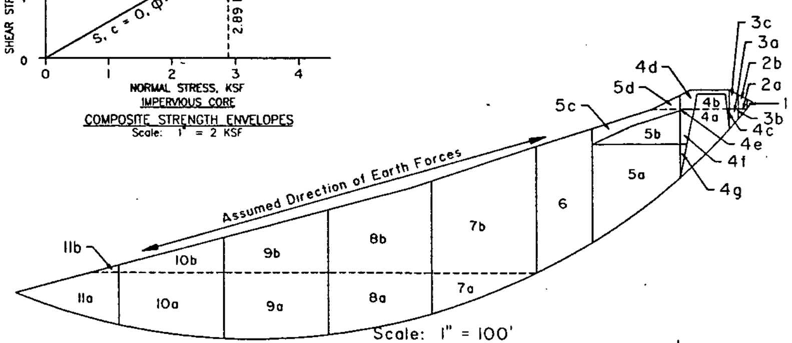
$$F.S. = \frac{1704.7}{1455.5} = 1.17$$



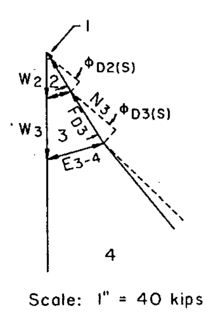
COMPOSITE STRENGTH ENVELOPES
Scale: 1" = 2 KSF

MATERIAL	UNIT WEIGHT (pcf)		S-STRENGTH				R-STRENGTH			
	γ_m – Moist	γ_s – Saturated	φ (deg.)	COHESION, c (kips/sq. ft.)	ϕ_D (deg.)	$C_D/\Delta L$ (psf)	φ (deg.)	COHESION, c (kips/sq. ft.)	ϕ_D (deg.)	$C_D/\Delta L$ (psf)
RANDOM FILL II	137	140	34	0	18.47	0	15	1.3	7.56	643.6
DRAINAGE FILL	130	138	36	0	19.78	0	36	0	–	0
TRANSITION FILL	127	136	32	0	17.19	0	32	0	–	0
IMPERVIOUS CORE	128	130	30	0	15.95	0	13	1.0	6.52	495.1

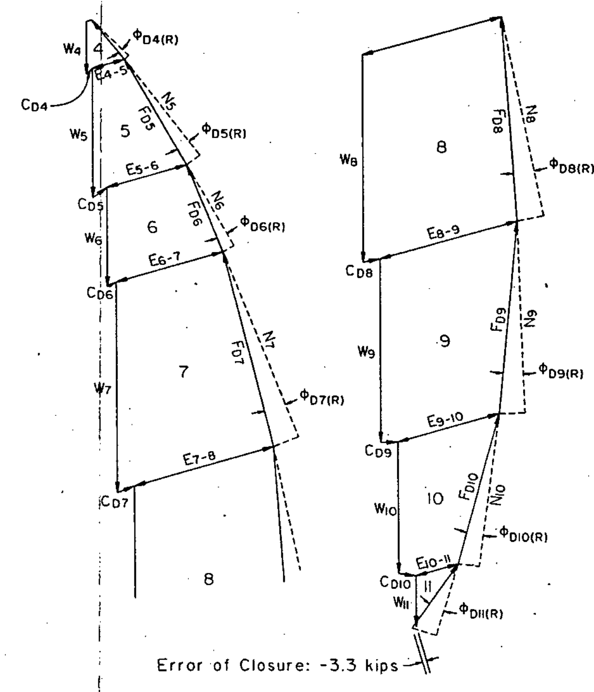
SELECTED DESIGN DATA



Scale: 1" = 100'

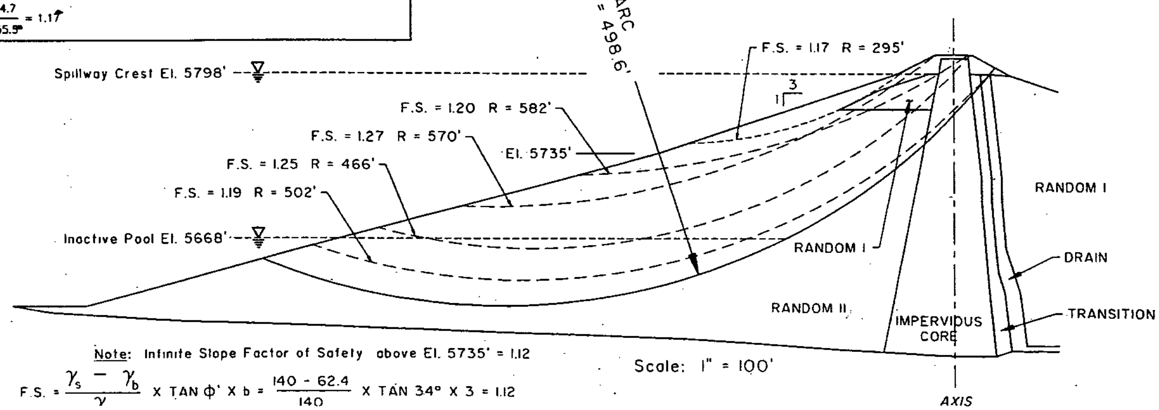


Scale: 1" = 40 kips



Error of Closure: -3.3 kips

Scale: 1" = 400 kips Scale: 1" = 400 kips



Scale: 1" = 100'

Note: Infinite Slope Factor of Safety above El. 5735' = 1.12

$$F.S. = \frac{\gamma_s - \gamma_b}{\gamma} \times \tan\phi' \times b = \frac{140 - 62.4}{140} \times \tan 34° \times 3 = 1.12$$

LITTLE DELL LAKE
SALT LAKE CITY STREAMS, UTAH

STABILITY ANALYSIS
SUDDEN DRAWDOWN

DEPARTMENT OF THE ARMY
SACRAMENTO DISTRICT, CORPS OF ENGINEERS
SACRAMENTO, CALIFORNIA

SUBMITTED: DAVE RICKETTS
SUBMITTED:

DRAWN BY: R. BRADLEY
CHECKED BY: D. R.

PLATE 38

SLICE NO.	SEGMENT NO.	SEGMENT AREA (sq. ft.)	SOIL UNIT WEIGHT (pcf) MOIST	SOIL UNIT WEIGHT (pcf) SUB-MERGED	SEGMENT WEIGHT (kips)	SLICE WEIGHT (kips)	BASE LENGTH OF SLICE, ΔL (ft.)	c·ΔL (kip-ft.)	F.S. = 1.29: c·ΔL / F.S. (kip-ft.)	F.S. = 1.29: ϕ_D (deg.)
1	1a	301.2	137	-	41.3	161.8	64.6	128.4	99.6	10.2
	1b	580.1	130	-	75.4					
	1c	329.6	137	-	45.2					
2	2a	3708.7	128	-	474.7	643.3	76.4	198.6	154.1	3.9
	2b	97.6	137	-	133.7					
	2c	252.9	130	-	328.8					
	2d	395.9	137	-	542.4					
	2e	509.6	127	-	64.7					
	2f	26.3	130	-	3.4					
3	3a	71.0	137	-	9.7	148.1	12.8	0	0	25.9
	3b	44.4	130	-	5.8					
	3c	554.0	130	-	72.0					
	3d	477.4	127	-	60.6					
4	4a	34.3	137	-	4.7	155.2	12.6	0	0	29.4
	4b	676.7	130	-	88.0					
	4c	480.7	130	-	62.5					
5	5a	3.7	137	-	0.5	931.1	63.8	127.6	99.0	10.2
	5b	7158.6	130	-	930.6					
6	6	8253.3	130	-	1072.9	1072.9	58.8	117.6	91.2	10.2
7	7a	1262.7	130	-	164.2	166.2	8.3	0	0	29.4
	7b	15.5	130	-	2.0					
8	8a	8678.1	130	-	1128.2	1203.9	57.9	115.8	89.8	7.0
	8b	227.6	130	-	29.6					
	8c	736.7	-	62.6	46.1					
9	9a	7875.3	130	-	1023.8	1180.0	55.2	110.4	85.6	7.0
	9b	235.8	130	-	30.7					
	9c	2006.0	-	62.6	125.6					
10	10a	7072.4	130	-	919.4	1138.9	53.2	106.4	82.5	7.0
	10b	244.1	130	-	31.7					
	10c	2999.0	-	62.6	187.7					
11	11a	6275.8	130	-	815.8	1082.5	51.8	103.6	80.4	7.0
	11b	249.8	130	-	32.5					
	11c	3741.4	-	62.6	234.2					
12	12a	5492.5	130	-	714.0	1012.5	50.8	101.6	78.8	7.0
	12b	250.0	130	-	32.5					
	12c	4248.2	-	62.6	265.9					
13	13a	4765.6	130	-	619.5	932.7	50.2	100.4	77.9	7.0
	13b	250.0	130	-	32.5					
	13c	4483.6	-	62.6	280.7					
14	14a	4139.0	130	-	538.1	846.7	50.0	100.0	77.6	7.0
	14b	250.0	130	-	32.5					
	14c	4410.9	-	62.6	276.1					
15	15a	3488.3	130	-	453.5	746.1	50.1	100.2	77.7	7.0
	15b	248.8	130	-	32.3					
	15c	4158.3	-	62.6	260.3					
16	16a	2719.7	130	-	353.6	623.7	50.6	101.2	78.5	7.0
	16b	233.5	130	-	30.4					
	16c	3831.2	-	62.6	239.8					
17	17a	1916.4	130	-	249.1	485.4	51.4	102.8	79.8	7.0
	17b	214.0	130	-	27.8					
	17c	3330.4	-	62.6	208.5					
18	18a	1121.8	130	-	145.8	334.3	52.7	105.4	81.8	7.0
	18b	194.5	130	-	25.3					
	18c	2606.4	-	62.6	163.2					
19	19a	845.9	130	-	110.0	235.5	54.5	109.0	84.6	7.0
	19b	175.1	130	-	22.8					
	19c	1642.1	-	62.6	102.8					
20	20a	950.1	130	-	123.5	179.3	84.3	168.6	130.8	7.0
	20b	79.3	130	-	10.3					
	20c	143.4	125	-	17.9					
	20d	442.8	-	62.6	27.7					

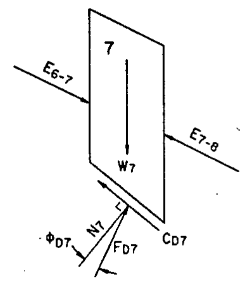
SELECTED DESIGN DATA

MATERIAL	Q-STRENGTH ϕ (deg.)	Q-STRENGTH COHESION, c (kips/sq. ft.)	UNIT WEIGHT (pcf) γ_m-Moist	UNIT WEIGHT (pcf) γ_s-Saturated	UNIT WEIGHT (pcf) γ_b-Buoyant
IMPERVIOUS CORE	5	2.6	128	130	-
RANDOM FILL I	13	2.0	130	133	-
RANDOM FILL II ①	13	2.0	137	140	-
FOUNDATION	9	2.0	120	125	62.6
TRANSITION FILL	32	0	127	136	-
DRAIN FILL	36	0	130	138	-

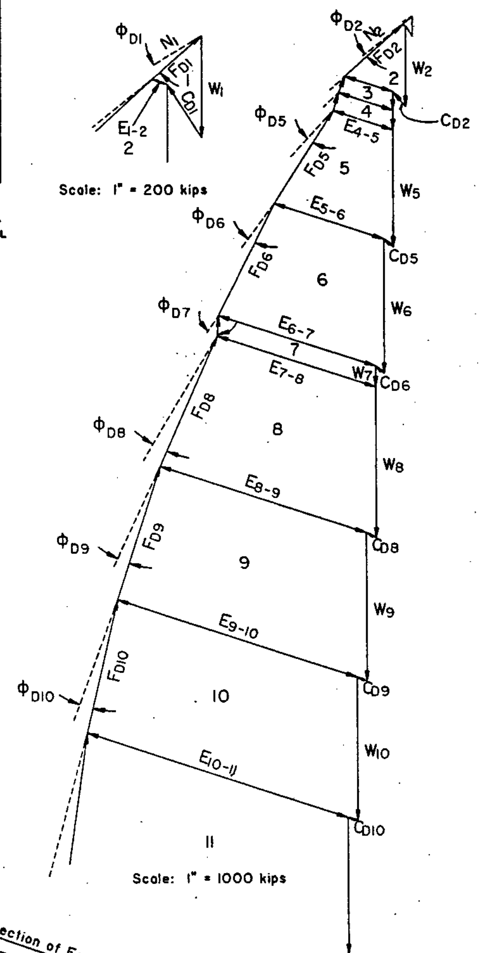
$$\phi_D = \tan^{-1} \times \frac{\tan\phi}{F.S.}$$

NOTE:

① RANDOM II Q-STRENGTHS ARE CONSERVATIVELY ASSUMED TO BE EQUAL TO RANDOM I STRENGTHS FOR THE STABILITY ANALYSIS.

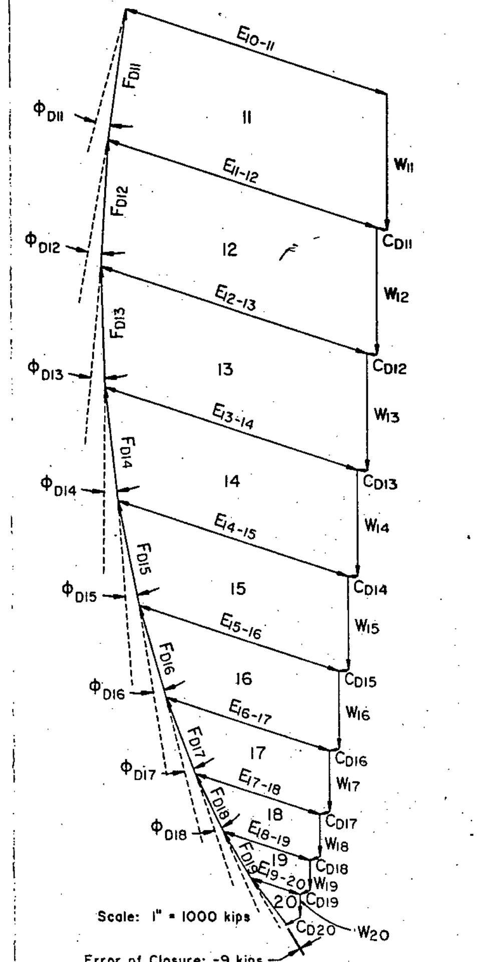


TYPICAL SLICE



Scale: 1" = 200 kips

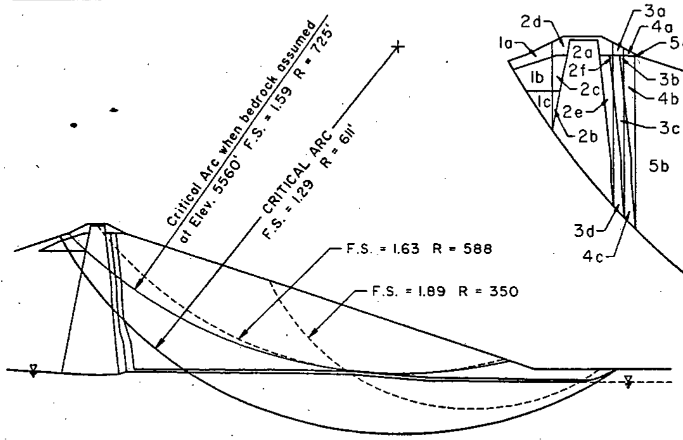
Scale: 1" = 1000 kips



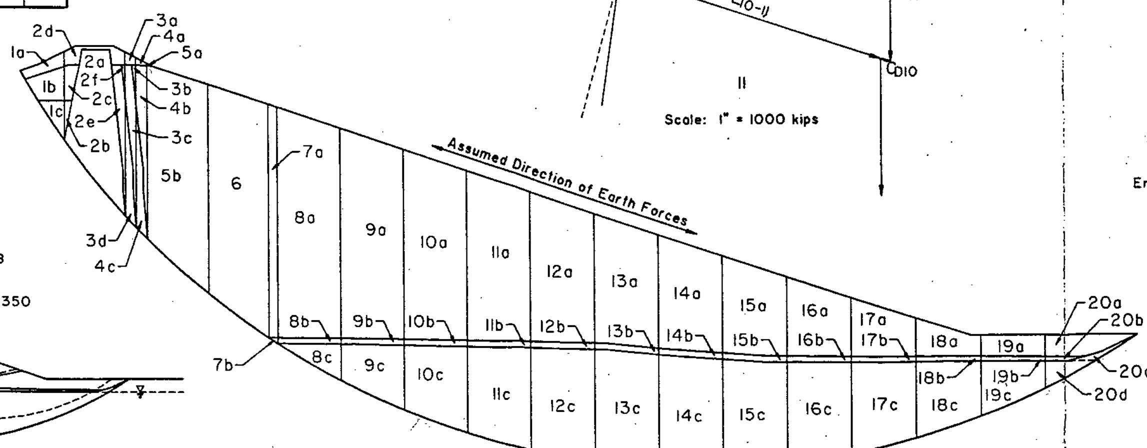
Scale: 1" = 1000 kips

Error of Closure: -9 kips

COMPOSITE FORCE POLYGON
FOR F.S. = 1.29



Scale: 1" = 200'



Scale: 1" = 100'

LITTLE DELL LAKE
SALT LAKE CITY STREAMS, UTAH

STABILITY ANALYSIS
END OF CONSTRUCTION

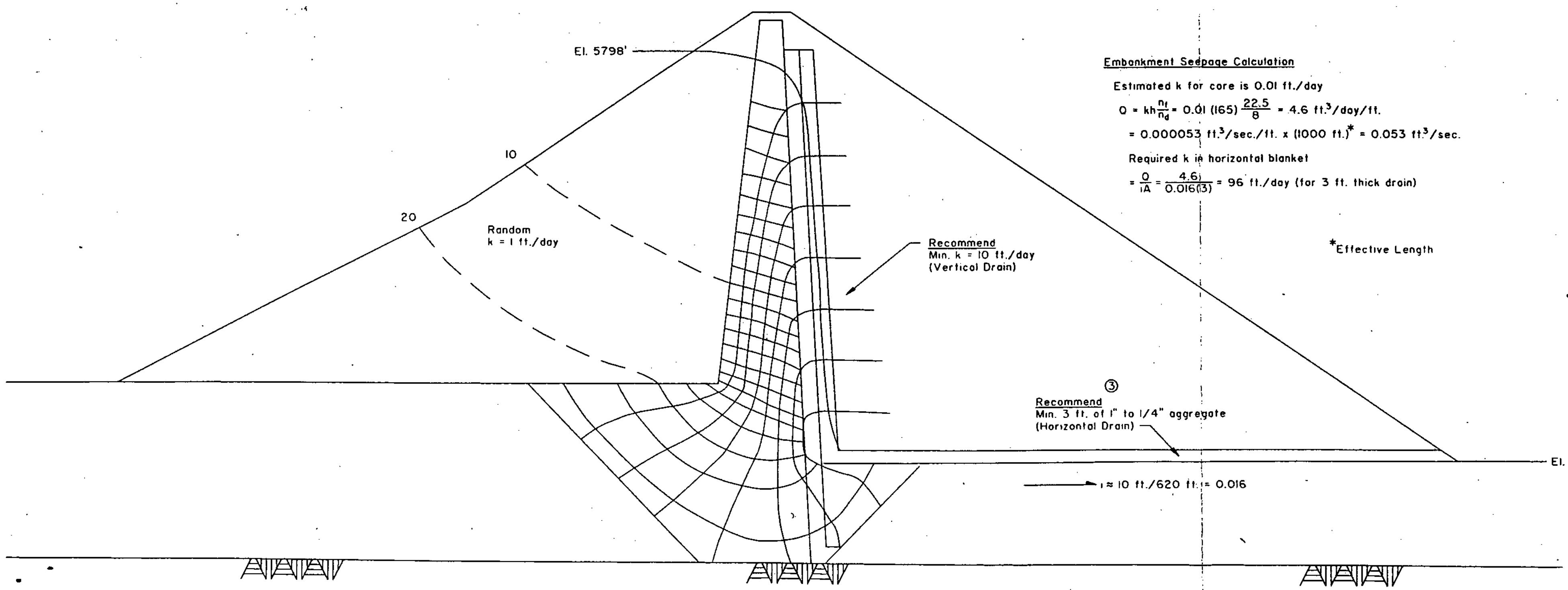
DEPARTMENT OF THE ARMY
SACRAMENTO DISTRICT, CORPS OF ENGINEERS
SACRAMENTO, CALIFORNIA

SUBMITTED:
DAVE RICKETTS

SUBMITTED:

R. BRADLEY | D. R.

PLATE 39



Embankment Seepage Calculation

Estimated k for core is 0.01 ft./day

$Q = kh\frac{n_f}{n_d} = 0.01\,(165)\,\frac{22.5}{8} = 4.6\ ft.^3/day/ft.$

$= 0.000053\ ft.^3/sec./ft. \times (1000\ ft.)^* = 0.053\ ft.^3/sec.$

Required k in horizontal blanket

$= \frac{Q}{iA} = \frac{4.6}{0.016(3)} = 96\ ft./day$ (for 3 ft. thick drain)

*Effective Length

Flow Net - Steady Seepage

Transformed Section

$k_H = 4k_V$

GRAPHIC SCALES

40 0 40 80 120 160 Ft.

HORIZONTAL SCALE: 1" = 80 FEET

20 0 20 40 60 80 Ft.

VERTICAL SCALE: 1" = 40 FEET

Notes:

1. This Plate provided for information and possible future use in evaluating seepage through the Dam.

2. This plate is redrawn relatively unchanged from Plate 146 (revised April 1988) of the D.M. No. 10, June 1988. The Graphic Scales have been corrected.

3. Based on Hazen's Equation the As-Built permeability of the Inclined and Horizontal Drainage Layers ranges from 15,000 to 200,000 ft/day and averages about 85,000 ft/day.

LITTLE DELL LAKE
SALT LAKE CITY STREAMS, UTAH

IMPERVIOUS CORE FLOW NET
STEADY SEEPAGE

DEPARTMENT OF THE ARMY
SACRAMENTO DISTRICT, CORPS OF ENGINEERS
SACRAMENTO, CALIFORNIA

SUBMITTED: MICHAEL D. RAMSBOTHAM

SUBMITTED:

R. BRADLEY | D. R.

PLATE 40

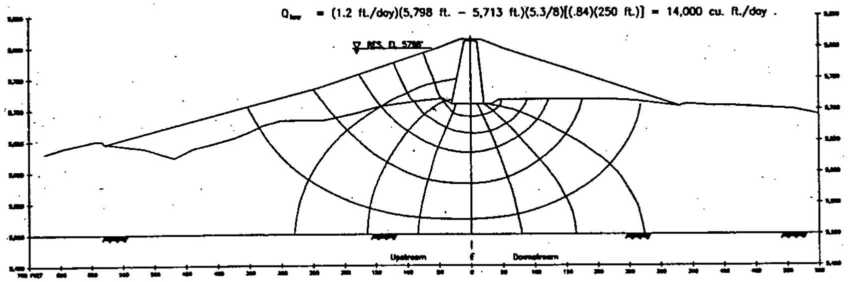
Embankment Seepage Calculation for Model #1

$Q = k \cdot \Delta h \cdot \frac{N_F}{N_D} \cdot W$

Q_{avg} = (27.9 ft./day)(5,798 ft. – 5,713 ft.)(5.3/8)(250 ft.) = 392,000 cu. ft./day .

Q_{high} = (168 ft./day)(5,798 ft. – 5,713 ft.)(5.3/8)[(.16)(250 ft.)] = 378,000 cu. ft./day .

Q_{low} = (1.2 ft./day)(5,798 ft. – 5,713 ft.)(5.3/8)[(.84)(250 ft.)] = 14,000 cu. ft./day .



MODEL #1
FLOW NET STEADY SEEPAGE
@ STA. 12+00

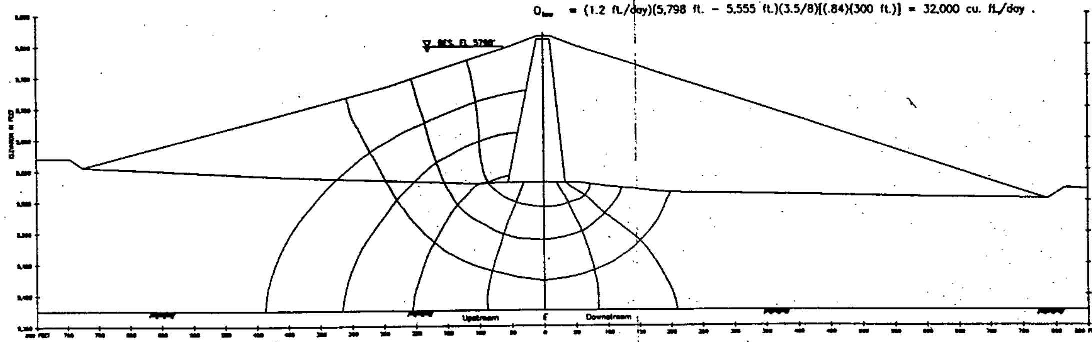
Embankment Seepage Calculation for Model #2

$Q = k \cdot \Delta h \cdot \frac{N_F}{N_D} \cdot W$

Q_{avg} = (27.9 ft./day)(5,798 ft. – 5,555 ft.)(3.5/8)(300 ft.) = 889,000 cu. ft./day .

Q_{high} = (168 ft./day)(5,798 ft. – 5,555 ft.)(3.5/8)[(.16)(300 ft.)] = 857,000 cu. ft./day .

Q_{low} = (1.2 ft./day)(5,798 ft. – 5,555 ft.)(3.5/8)[(.84)(300 ft.)] = 32,000 cu. ft./day .



MODEL #2
FLOW NET STEADY SEEPAGE
@ STA. 14+50

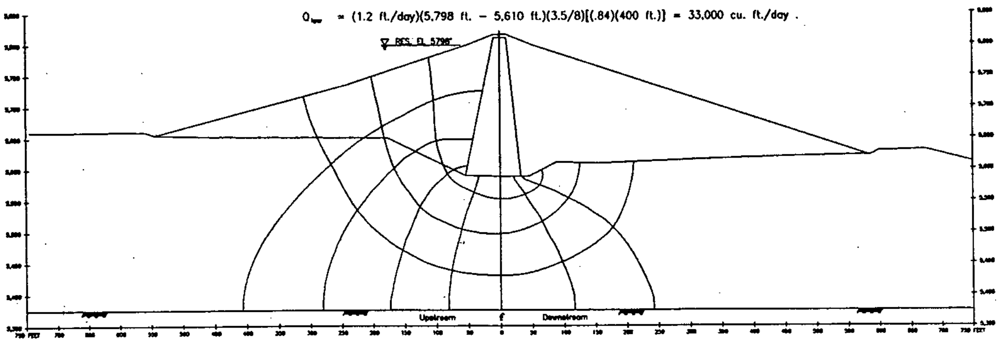
Embankment Seepage Calculation for Model #3

$Q = k \cdot \Delta h \cdot \frac{N_F}{N_D} \cdot W$

Q_{avg} = (27.9 ft./day)(5,798 ft. – 5,610 ft.)(3.5/8)(400 ft.) = 917,000 cu. ft./day .

Q_{high} = (168 ft./day)(5,798 ft. – 5,610 ft.)(3.5/8)[(.16)(400 ft.)] = 884,000 cu. ft./day .

Q_{low} = (1.2 ft./day)(5,798 ft. – 5,610 ft.)(3.5/8)[(.84)(400 ft.)] = 33,000 cu. ft./day .



MODEL #3
FLOW NET STEADY SEEPAGE
@ STA. 18+00

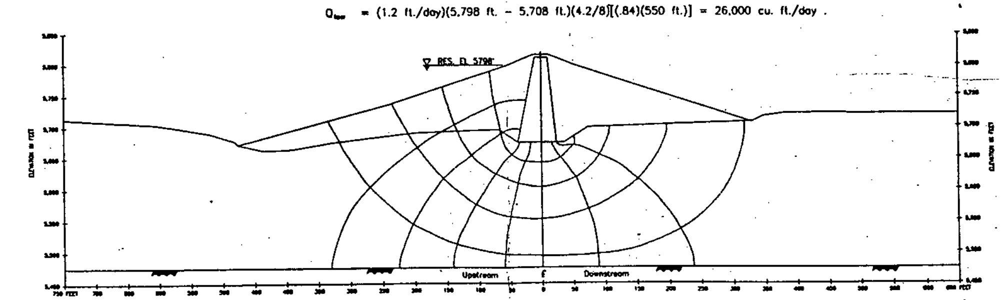
Embankment Seepage Calculation for Model #4

$Q = k \cdot \Delta h \cdot \frac{N_F}{N_D} \cdot W$

Q_{avg} = (27.9 ft./day)(5,798 ft. – 5,708 ft.)(4.2/8)(550 ft.) = 724,000 cu. ft./day .

Q_{high} = (168 ft./day)(5,798 ft. – 5,708 ft.)(4.2/8)[(.16)(550 ft.)] = 698,000 cu. ft./day .

Q_{low} = (1.2 ft./day)(5,798 ft. – 5,708 ft.)(4.2/8)[(.84)(550 ft.)] = 26,000 cu. ft./day .



MODEL #4
FLOW NET STEADY SEEPAGE
@ STA. 23+50

Assumptions for Flow Net Calculations

1. Q_{high} is the seepage quantity calculated for the coefficient of permeability equal to 168 ft./day, which represents 16% of the embankment foundation width.
2. Q_{low} is the seepage quantity calculated for the coefficient of permeability equal to 1.2 ft./day, which represents 84% of the embankment foundation width.
3. Q_{avg} is the average seepage quantity calculated for the coefficient of permeability equal to 27.9 ft./day . This quantity is equal to Q_{high} plus Q_{low} .
4. The horizontal and vertical coefficients of permeability (k) of the foundation are equal.
5. The coefficient of permeability of the embankment random fill equals the coefficient of permeability of the foundation.
6. The central core is impervious (k=0).
7. The depth to an impermeable boundary from the bottom of the core trench is 200 feet.
8. The horizontal drain blanket extends to the impervious core.
9. The "invert" elevation of the drain blanket is equal to the average elevation of the drain blanket at the selected station.
10. Seepage between Stations 10+40 and 11+00 and Stations 26+00 and 27+80 is negligible.
11. $Q = k \cdot \Delta h \cdot \frac{N_F}{N_D} \cdot W$: where k = coefficient of permeability; Δh = the difference in head, gross pool elevation (5,798') minus the "invert" elevation of the drain blanket; N_F = number of flow channels; N_D = number of equipotential drops; and W = effective width of dam associated with a particular model/section.
12. Models No. 1, 2, 3 and 4 represent the embankment from Station 11+00 to 13+50, Station 13+50 to 16+50, Station 16+50 to 20+50 and Station 20+50 to 26+00 respectively.
13.

Model @ Station	Effective Width Reach in Stations, (=W ft.)	k ft./day	Δh	$\frac{N_F}{N_D}$	Q_{avg} cfs
1 @ 12+00	11+00 to 13+50, (250)	27.9	85	$\frac{5.3}{8}$	4.5
2 @ 14+50	13+50 to 16+50, (300)	27.9	243	$\frac{3.5}{8}$	10.3
3 @ 18+00	16+50 to 20+50, (400)	27.9	188	$\frac{3.5}{8}$	10.6
4 @ 23+50	20+50 to 26+00, (550)	27.9	90	$\frac{4.2}{8}$	8.4
			Total Q_{avg} =		34 cfs
For Grout Curtain 75% effective:			.25 Q_{avg} =		8.5 cfs

Notes:

1. This Plate provided for information and possible future use in evaluating foundation seepage.
2. This plate was originally designed by W.C. Jones, drawn by R. Iwasa and R. Bradley, and checked by M. Ramsbotham in December 1988. It was an addition to D.M. No. 10, June 1988, as Plate 146-A, by addendum 14 December 1988, and is presented here unchanged.

GRAPHIC SCALES

100 0 100 200 300 400

SCALE: 1" = 200 FEET

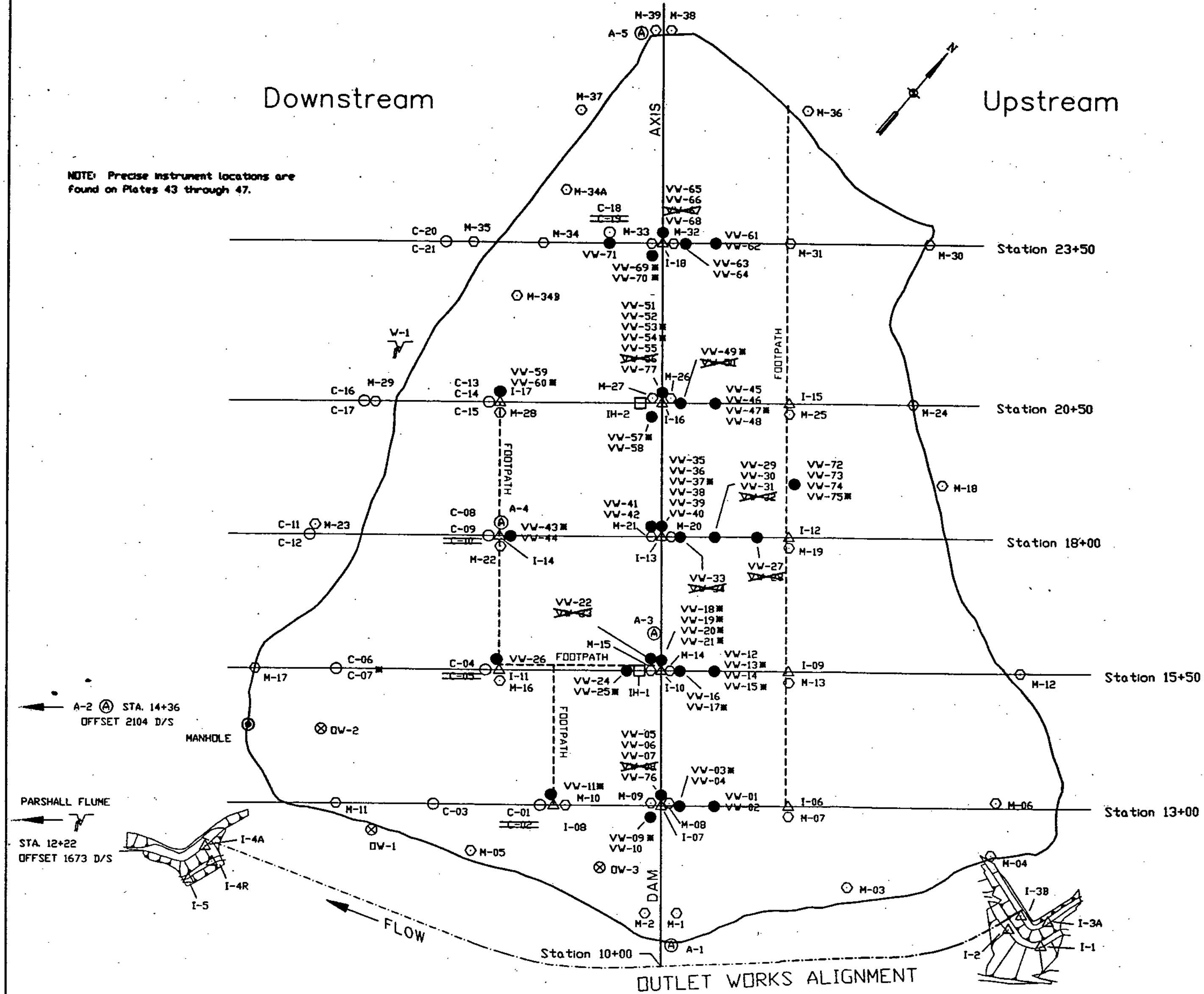
LITTLE DELL LAKE
SALT LAKE CITY STREAMS, UTAH

FOUNDATION FLOW NETS
STEADY SEEPAGE

DEPARTMENT OF THE ARMY
SACRAMENTO DISTRICT, CORPS OF ENGINEERS
SACRAMENTO, CALIFORNIA

SUBMITTED:
MICHAEL D. RAMSBOTHAM

SUBMITTED:



SURVEY MONUMENT LOCATIONS - BASELINE

MONUMENT NUMBER	CONST. COORDINATES		ELEVATION	STATE PLANE COORDINATES	
	STATION	OFFSET		NORTH	EAST
* M-01	11+00±	28± U/S	5812.92	7448632.862	1584560.788
* M-02	11+00±	28± D/S	5813.66	7448597.859	1584517.185
M-03	11+50.78	350.03 U/S	5704.67	INUNDATED	INUNDATED
M-04	12+12.24	615.75 U/S	5635.46	INUNDATED	INUNDATED
* M-05	12+13.90	351.19 D/S	5709.31	7448482.606	1584197.484
M-06	13+10.63	625.83 U/S	5631.81	INUNDATED	INUNDATED
M-07	12+91.00	240.81 U/S	5733.59	INUNDATED	INUNDATED
* M-08	13+00±	13± U/S	5814.06	7448772.602	1584430.250
* M-09	13+00±	13± D/S	5814.34	7448753.583	1584409.564
* M-10	12+95.17	199.14 D/S	5746.37	7448641.490	1584263.052
* M-11	13+00.28	599.93 D/S	5620.81	7448391.708	1583949.798
M-12	15+50.20	670.81 U/S	5630.66	INUNDATED	INUNDATED
M-13	15+39.32	241.38 U/S	5733.47	INUNDATED	INUNDATED
* M-14	15+50±	13± U/S	5814.41	7448954.695	1584281.585
* M-15	15+50±	13± D/S	5814.54	7448932.697	1584258.108
* M-16	15+39.91	298.74 D/S	5711.95	7448767.908	1584031.169
* M-17	15+49.77	749.73 D/S	5588.41	7448489.867	1583676.229
M-18	18+99.74	524.84 U/S	5666.19	INUNDATED	INUNDATED
M-19	17+90.42	240.51 U/S	5733.32	INUNDATED	INUNDATED
* M-20	18+00±	13± U/S	5814.39	7449159.472	1584113.226
* M-21	18+00±	13± D/S	5814.71	7449140.161	1584091.960
* M-22	17+90.14	298.37 D/S	5712.15	7448961.818	1583873.053
* M-23	18+18.44	639.91 D/S	5630.74	7448767.524	1583590.875
M-24	20+50.39	470.33 U/S	5673.05	INUNDATED	INUNDATED
M-25	20+40.33	240.24 U/S	5733.44	INUNDATED	INUNDATED
* M-26	20+50±	13± U/S	5814.05	7449379.530	1583932.226
* M-27	20+50±	13± D/S	5814.26	7449361.368	1583911.888
* M-28	20+40.12	299.88 D/S	5712.29	7449154.386	1583713.676
* M-29	20+49.34	529.66 D/S	5652.56	7449016.017	1583530.022
M-30	23+50.24	499.74 U/S	5696.02	INUNDATED	INUNDATED
M-31	23+50.58	241.05 U/S	5732.84	INUNDATED	INUNDATED
* M-32	23+50±	13± U/S	5813.71	7449583.621	1583765.353
* M-33	23+50±	13± D/S	5813.93	7449566.266	1583744.083
* M-34	23+49.59	221.87 D/S	5739.60	7449443.188	1583578.096
* M-34A	24+49.65	179.95 D/S	5753.08	7449547.099	1583547.187
* M-34B	22+49.88	270.03 D/S	5724.25	7449335.603	1583603.975
* M-35	23+50.07	349.46 D/S	5716.46	7449362.755	1583479.071
M-36	25+99.70	272.20 U/S	5737.17	INUNDATED	INUNDATED
* M-37	25+99.73	153.56 D/S	5778.53	7449680.074	1583472.643
* M-38	27+50±	13± U/S	5812.95	7449863.542	1583538.060
* M-39	27+50±	13± D/S	5813.31	7449845.599	1583516.042

NOTE: The State Plane coordinates and elevations for monuments indicated with a "*" were determined during the 25 OCT 1993 survey. This survey utilized Global Positioning System (GPS) satellites and forms the post construction alignment baseline. Data listed for those monuments inundated by the reservoir pool during this survey were determined using the construction control survey of 15 OCT 1992.

INSTRUMENTATION SYMBOL LEGEND

- IH-1 INSTRUMENT HOUSE
- I-07 INCLINOMETER
- C-06 OPEN TUBE PIEZOMETER
- VW-1 VIBRATING WIRE PIEZOMETER
- OW-3 OBSERVATION WELL
- M-07 SURVEY MONUMENT
- A-5 ACCELEROGRAPH
- V-1 FLOW MEASUREMENT DEVICE
- MANHOLE
- VW-75* LIGHTNING DAMAGED VWP
- ~~VW-62~~ LIGHTNING DESTROYED VWP
- ~~I-02~~ OTP DESTROYED DURING CONSTRUCTION

SCALE: 1"=200' 100' 0 200' 400'

LITTLE DELL LAKE
SALT LAKE CITY STREAMS, UTAH

PLAN VIEW OF INSTRUMENTATION

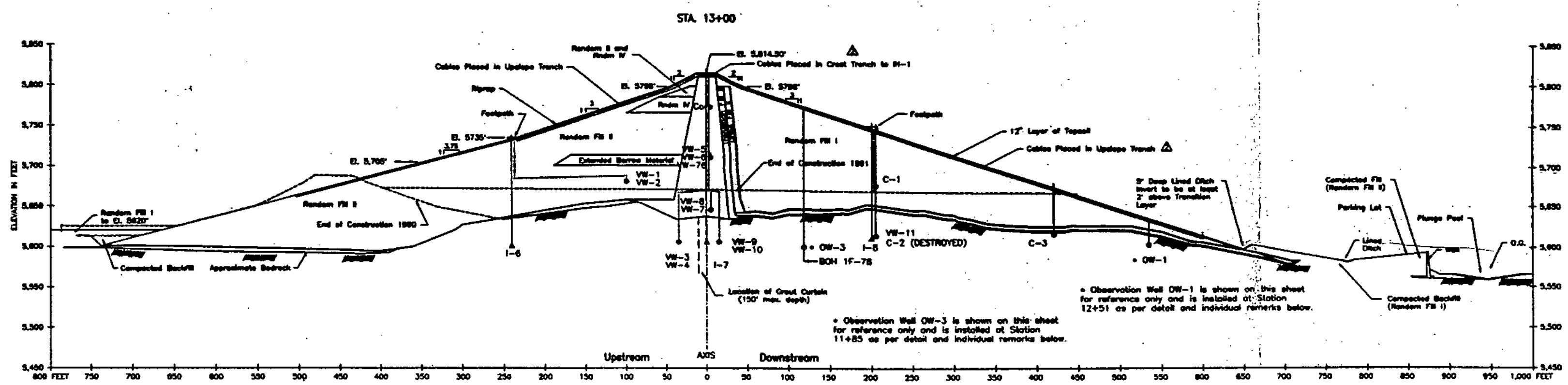
DEPARTMENT OF THE ARMY
SACRAMENTO DISTRICT, CORPS OF ENGINEERS
SACRAMENTO, CALIFORNIA

SUBMITTED: MICHAEL D. RAMSBOTHAM

APPROVED:

JVR JVR MDR

PLATE 42



NAME	TYPE	STATION	DAM AXIS OFFSET	TIP ELEV. IN FEET	MATERIAL TYPE	INSTALLATION FILL ELEV.	METHOD OF INSTALLATION	REMARKS
VW-1	VIBRATING WIRE PIEZO	13+00	100 U/S	5681.1	RANDOM FILL II	5686.9	SINGLE PAIR VIBRATING WIRE/EMB.	INSTALLED WITH VW-2. Spliced 10-05-92 ● Sta. 13+11, 38 u/s, 5797 ft.
VW-2	VIBRATING WIRE PIEZO	13+00	100 U/S	5680.3	RANDOM FILL II	5686.9	SINGLE PAIR VIBRATING WIRE/EMB.	INSTALLED WITH VW-1. Spliced 11-21-92 ● Sta. 13+00, 10 d/s, 5810 ft.
VW-3	VIBRATING WIRE PIEZO	13+00	35 U/S	5606.0	BEDROCK, U/S FROM GROUT CURTAIN	5666.4	SINGLE PAIR VIBRATING WIRE/FND.	INSTALLED WITH VW-4.
VW-4	VIBRATING WIRE PIEZO	13+00	35 U/S	5605.4	BEDROCK, U/S FROM GROUT CURTAIN	5666.4	SINGLE PAIR VIBRATING WIRE/FND.	INSTALLED WITH VW-3.
VW-5	VIBRATING WIRE PIEZO	13+00	5 D/S	5710.8	CORE	5714.7	SINGLE PAIR VIBRATING WIRE/CORE	INSTALLED WITH VW-6 AND IN CONJUNCTION WITH VW-76.
VW-6	VIBRATING WIRE PIEZO	13+00	5 D/S	5710.0	CORE	5714.7	SINGLE PAIR VIBRATING WIRE/CORE	INSTALLED WITH VW-5 AND IN CONJUNCTION WITH VW-76.
VW-7	VIBRATING WIRE PIEZO	13+00	5 D/S	5644.9	CORE	5667.1	SINGLE PAIR VIBRATING WIRE/CORE	INSTALLED WITH VW-8.
VW-8	VIBRATING WIRE PIEZO	13+00	5 D/S	5645.5	CORE	5667.1	SINGLE PAIR VIBRATING WIRE/CORE	INSTALLED WITH VW-7.
VW-9	VIBRATING WIRE PIEZO	13+00	15 D/S	5610.4	BEDROCK, D/S FROM GROUT CURTAIN	5668.7	SINGLE PAIR VIBRATING WIRE/FND.	INSTALLED WITH VW-10. Note that sand section of installation is 8.1 ft. vs. nominal 5 ft. Sand section extended to cover water loss at el. 5614.7 ft.
VW-10	VIBRATING WIRE PIEZO	13+00	15 D/S	5609.6	BEDROCK, D/S FROM GROUT CURTAIN	5668.7	SINGLE PAIR VIBRATING WIRE/FND.	INSTALLED WITH VW-9. Note that sand section of installation is 8.1 ft. vs. nominal 5 ft. Sand section extended to cover water loss at el. 5614.7 ft.
VW-11	VIBRATING WIRE PIEZO	13+00	205 D/S	5616.2	BEDROCK	5660.2	SINGLE VIBRATING WIRE WITH OPEN TUBE/FND.	INSTALLED WITH C-2. Spliced 11-22-92 ● Back of Instrument House IH-1.
C-1	OPEN TUBE PIEZO	13+00	205 D/S	5676.0	RANDOM FILL I	5681.0	SINGLE OPEN TUBE ADDED IN EMB.	INSTALLED ALONE. Spliced 09-28-91 ● el. 5651.8 ft.
C-2	OPEN TUBE PIEZO	13+00	205 D/S	5615.2	BEDROCK	5660.2	SINGLE VIBRATING WIRE WITH OPEN TUBE/FND.	*** NON FUNCTIONAL *** — Open Tube was damaged by settlement of the embankment during construction.
C-3	OPEN TUBE PIEZO	13+00	420 D/S	5615.7	BEDROCK	5632.3	SINGLE OPEN TUBE/FND.	INSTALLED ALONE. Open tube spliced at el. 5651.8 ft. C-3 VWP cable spliced 11-12-92 ● Sta. 15+50, Axis, el. 5810 ft.
I-6	INCLINOMETER	13+00	240 U/S	5602.7	BEDROCK	5640.9	INCLINOMETER	INSTALLATION OKAY. The bottom of this installation was grouted twice. NOTE — Bedrock has high permeability.
I-7	INCLINOMETER	13+00	0	5594.8	BEDROCK	5666.8	INCLINOMETER	Inclinometer grouted to top of rock due to installation problem. Grouted section 44 ft. Spliced 04-21-92 ● approx. el. 5660 ft.
I-8	INCLINOMETER	13+00	200 D/S	5613.0	BEDROCK	5660.3	INCLINOMETER	INSTALLATION OKAY. Spliced 10-17-91 ● el. 5667.3 ft.
OW-1	OBSERVATION WELL	12+51	534 D/S	5602.0	BEDROCK	5655.6	OBSERVATION WELL	INSTALLED AT 12+51. Located in a highly fractured sandstone to maximize potential for measuring and ground seepage.
OW-3	OBSERVATION WELL	11+85	118 D/S	5599.0	BEDROCK	5728.2	OBSERVATION WELL	RECOVERED 1F-78 as an observation well. An exploratory hole previously used as a piezometer. It will provide useful and ground seepage data.
VW-76	VIBRATING WIRE PIEZO	13+10	5 D/S	5709.0	CORE	5714.7	HIGH AIR ENTRY FILTER; DIRECT BURIAL VWP	INSTALLED IN CONJUNCTION WITH VW-5,6. Used for comparison of pore pressure measurements between contract installation method and direct burial method.

Notes:

1. All instrument cables routed in trenches are placed with approximately 10 feet of slack length for every 100 feet of trench.
2. The term "Connector Trench" refers to an excavated trench on the approximately horizontal fill surface to route the vibrating wire cables from the point of installation to the appropriate inclinometer instrument mound where they shall be advanced vertically with the fill.
3. The term "Upslope Trench" refers to an excavated trench on the final grade to route the vibrating wire cables from the instrument mound, upslope, to a manhole at the crest which shall serve as a junction for the cables and as an enclosure for an inclinometer located on the dam axis.
4. The term "Crest Trench" refers to an excavated trench on the dam crest prior to construction of the paved road to route the vibrating wire cables from the manhole junction(s) to one of the two permanent Instrument House enclosures.
5. Open Tube Piezometers C-18 thru C-21 are retrofitted with a 1/2" diameter Vibrating Wire Transducer for the purpose of remote sensing the water levels in these instruments from Instrument House IH-2. The method and timing for each installation shall be approved by the Government Representative in the field.

INSTRUMENT LEGEND

SYMBOL	INSTRUMENT TYPE
I-6	INCLINOMETER
C-1	OPEN TUBE PIEZOMETER
OW-1	OBSERVATION WELL
VW-2	VIBRATING WIRE PIEZOMETER
VW-11 C-2	VIBRATING WIRE AND OPEN TUBE PIEZOMETERS
	VIBRATING WIRE PIEZOMETER CABLE (LEADLINE) ROUTE

GRAPHIC SCALE

50 0 50 100 150 200 250 FEET

SCALE: 1" = 150 FEET

LITTLE DELL LAKE
SALT LAKE CITY STREAMS, UTAH

INSTRUMENTATION SECTION
STATION 13+00

DEPARTMENT OF THE ARMY
SACRAMENTO DISTRICT, CORPS OF ENGINEERS
SACRAMENTO, CALIFORNIA

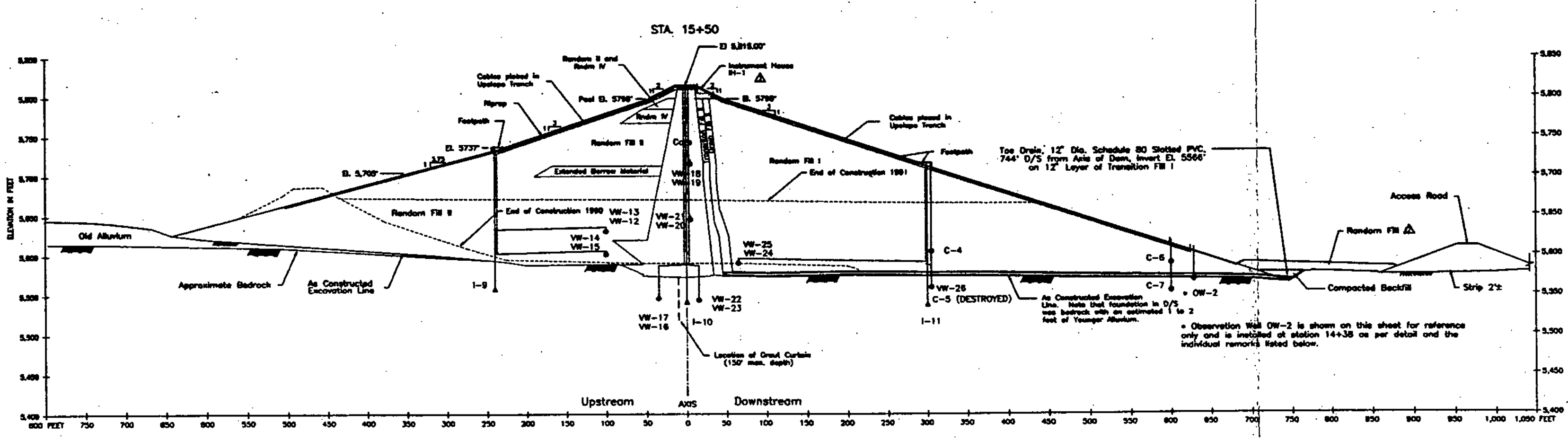
SUBMITTED: MICHAEL D. RAMSBOTHAM

SUBMITTED:

J. ROADIFER | M. D. R.

PLATE 43

LITTLE DELL PROJECT: PL-43 (LDIXE1RO.DWG) (EMB) 25 MAY 94 NLB



NAME	TYPE	STATION	OFFSET	TIP ELEV. IN FEET	MATERIAL TYPE	INSTALLATION FILL ELEV.	METHOD OF INSTALLATION	REMARKS
VW-12	VIBRATING WIRE PIEZO	15+50	100 U/S	5630.0	RANDOM FILL II	5636.5	SINGLE PAIR VIBRATING WIRE/EMB.	INSTALLED WITH VW-13.
VW-13	VIBRATING WIRE PIEZO	15+50	100 U/S	5630.8	RANDOM FILL II	5636.5	SINGLE PAIR VIBRATING WIRE/EMB.	INSTALLED WITH VW-12.
VW-14	VIBRATING WIRE PIEZO	15+50	100 U/S	5601.8	RANDOM FILL II	5606.0	SINGLE PAIR VIBRATING WIRE/EMB.	INSTALLED WITH VW-15. Spliced 10-92 ● Sta. 15+57, 48.8 ft. u/s, el. 5791 ft.
VW-15	VIBRATING WIRE PIEZO	15+50	100 U/S	5601.2	RANDOM FILL II	5606.0	SINGLE PAIR VIBRATING WIRE/EMB.	INSTALLED WITH VW-14.
VW-16	VIBRATING WIRE PIEZO	15+50	35 U/S	5545.4	BEDROCK, U/S FROM GROUT CURTAIN	5589.9	SINGLE PAIR VIBRATING WIRE/FND.	INSTALLED WITH VW-17. A steel tamping tool was lost in this installation at el. 5565.9 ft. Spliced 11-21-92 at Instrument House IH-1
VW-17	VIBRATING WIRE PIEZO	15+50	35 U/S	5546.2	BEDROCK, U/S FROM GROUT CURTAIN	5589.9	SINGLE PAIR VIBRATING WIRE/FND.	INSTALLED WITH VW-16. A steel tamping tool was lost in this installation at el. 5565.9 ft. Spliced 11-21-92 ● Sta. 15+50, 5 ft. d/s, el. 5810 ft.
VW-18	VIBRATING WIRE PIEZO	15+50	5 D/S	5716.8	CORE	5720.1	SINGLE PAIR VIBRATING WIRE/EMB.	INSTALLED WITH VW-19. Spliced 11-22-92 ● Instrument House IH-1
VW-19	VIBRATING WIRE PIEZO	15+50	5 D/S	5716.0	CORE	5720.1	SINGLE PAIR VIBRATING WIRE/EMB.	INSTALLED WITH VW-18. Spliced 11-22-92 ● Instrument House IH-1
VW-20	VIBRATING WIRE PIEZO	15+50	5 D/S	5645.0	CORE	5650.0	SINGLE PAIR VIBRATING WIRE/EMB.	INSTALLED WITH VW-21. Spliced 11-21-92 ● Instrument House IH-1
VW-21	VIBRATING WIRE PIEZO	15+50	5 D/S	5645.8	CORE	5650.0	SINGLE PAIR VIBRATING WIRE/EMB.	INSTALLED WITH VW-20. Spliced 11-21-92 ● Instrument House IH-1
VW-22	VIBRATING WIRE PIEZO	15+50	15 D/S	5544.1	BEDROCK, D/S FROM GROUT CURTAIN	5589.1	SINGLE PAIR VIBRATING WIRE/FND.	INSTALLED WITH VW-23. Spliced 11-21-92 ● Sta. 15+50, 5 ft. d/s, el. 5810 ft.
VW-23	VIBRATING WIRE PIEZO	15+50	15 D/S	5543.3	BEDROCK, D/S FROM GROUT CURTAIN	5589.1	SINGLE PAIR VIBRATING WIRE/FND.	INSTALLED WITH VW-22. Spliced 11-22-92 ● Sta. 15+50, axis, el. 5810 ft.
VW-24	VIBRATING WIRE PIEZO	15+50	65 D/S	5590.0	RANDOM FILL I	5594.1	SINGLE PAIR VIBRATING WIRE/EMB.	INSTALLED WITH VW-25. Spliced 10-23-92 ● Sta. 15+61, 37 ft. d/s, el. 5799 ft.
VW-25	VIBRATING WIRE PIEZO	15+50	65 D/S	5590.8	RANDOM FILL I	5594.1	SINGLE PAIR VIBRATING WIRE/EMB.	INSTALLED WITH VW-24. Spliced 10-23-92 ● Sta. 15+57, 30 ft. d/s, el. 5801 ft.
VW-26	VIBRATING WIRE PIEZO	15+50	305 D/S	5563.4	BEDROCK	5589.6	SINGLE VIBRATING WIRE WITH OPEN TUBE/FND.	INSTALLED WITH C-5. Spliced 10-23-92 ● Sta. 15+52, 12 ft. d/s, el. 5810 ft.
C-4	OPEN TUBE PIEZO	15+50	305 D/S	5605.0	RANDOM FILL I	5613.0	SINGLE OPEN TUBE/ADDED IN EMB.	INSTALLED ALONE.
C-5	OPEN TUBE PIEZO	15+50	305 D/S	5562.3	BEDROCK	5589.6	SINGLE VIBRATING WIRE WITH OPEN TUBE/FND.	*** NON FUNCTIONAL *** – Open tube was damaged by settlement of the embankment during construction.
C-6	OPEN TUBE PIEZO	15+50	600 D/S	5592.0	RANDOM FILL 1	5597.0	SINGLE OPEN TUBE/ADDED IN EMB.	INSTALLED ALONE. Retrofitted VWP wire spliced 11-22-92 ● Sta. 15+50, 10 ft. d/s, el. 5810 ft.
C-7	OPEN TUBE PIEZO	15+50	600 D/S	5556.5	BEDROCK	5579.5	SINGLE OPEN TUBE/FND.	INSTALLED ALONE. Retrofitted VWP wire spliced 11-21-92 ● Sta. 15+50, 5 ft. d/s, el. 5810 ft.
I-9	INCLINOMETER	15+50	240 U/S	5559.9	BEDROCK	5596.9	INCLINOMETER	INSTALLATION OKAY. Spliced 07-30-91 ● el. 5617.4 ft.
I-10	INCLINOMETER	15+50	0	5544.0	BEDROCK	5589.2	INCLINOMETER	INSTALLATION OKAY.
I-11	INCLINOMETER	15+50	300 D/S	5540.0	BEDROCK	5589.8	INCLINOMETER	INSTALLATION OKAY. Inclinometer was installed with internal grooves skewed 18.6 degrees clockwise from dam axis.
OW-2	OBSERVATION WELL	14+38	628 D/S	5558.2	DRAIN BLANKET	5578.4	OBSERVATION WELL	INSTALLED AT STA. 14+38. OW-2 placed in lowest spot of drainage 628 ft. d/s of axis. Retro. VWP wire spliced 09-22-92 ● Sta. 15+56, 90 ft. d/s, el. 5779 ft.

Notes:

1. All instrument cables routed in trenches are placed with approximately 10 feet of slack length for every 100 feet of trench.
2. The term "Connector Trench" refers to an excavated trench on the approximately horizontal fill surface to route the vibrating wire cables from the point of installation to the appropriate inclinometer instrument mound where they shall be advanced vertically with the fill.
3. The term "Upslope Trench" refers to an excavated trench on the final grade to route the vibrating wire cables from the instrument mound, upslope, to a manhole at the crest which shall serve as a junction for the cables and as an enclosure for an inclinometer located on the dam axis..
4. The term "Crest Trench" refers to an excavated trench on the dam crest prior to construction of the paved road to route the vibrating wire cables from the manhole junction(s) to one of the two permanent Instrument House enclosures.
5. Open Tube Piezometers C-18 thru C-21 are retrofitted with a 1/2" diameter Vibrating Wire Transducer for the purpose of remote sensing the water levels in these instruments from Instrument House IH-2. The method and timing for each installation shall be approved by the Government Representative in the field.

INSTRUMENT LEGEND

SYMBOL	INSTRUMENT TYPE
I-6	INCLINOMETER
C-1	OPEN TUBE PIEZOMETER
OW-1	OBSERVATION WELL
VW-2	VIBRATING WIRE PIEZOMETER
VW-11 C-2	VIBRATING WIRE AND OPEN TUBE PIEZOMETERS
	VIBRATING WIRE PIEZOMETER CABLE (LEADLINE) ROUTE

GRAPHIC SCALE

50 0 50 100 150 200 250 FEET

SCALE: 1" = 150 FEET

LITTLE DELL LAKE
SALT LAKE CITY STREAMS, UTAH

INSTRUMENTATION SECTION

STATION 15+50

DEPARTMENT OF THE ARMY
SACRAMENTO DISTRICT, CORPS OF ENGINEERS
SACRAMENTO, CALIFORNIA

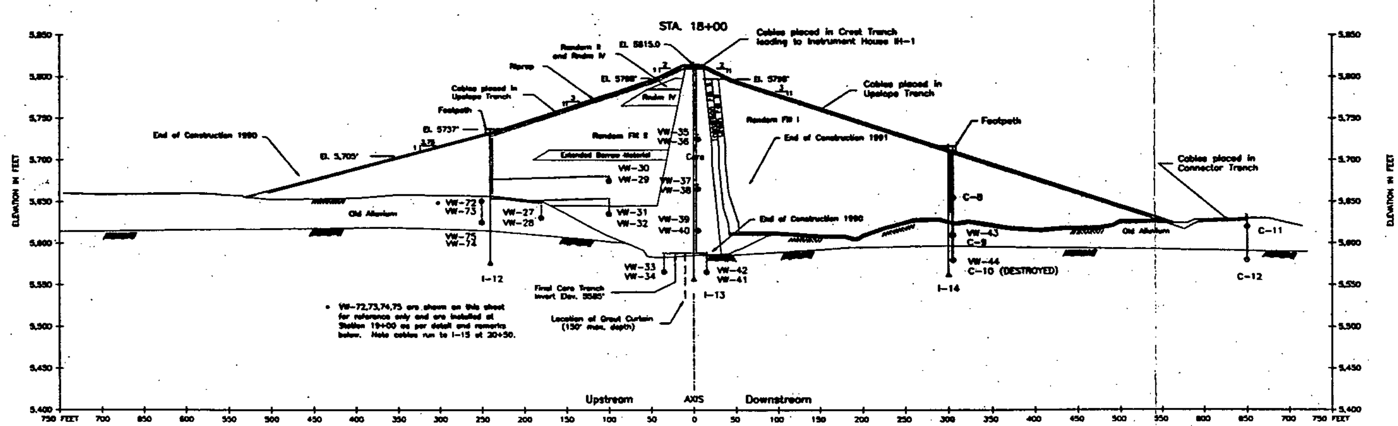
SUBMITTED: MICHAEL D. RAMSBOTHAM

SUBMITTED: RESIDENT ENGINEER

DRAWN BY: J. ROADIFER | CHECKED BY: M. D. R.

PLATE 44

LITTLE DELL PROJECT: PL-44 (LDIXE2RO.DWG) (EMB) 25 MAY 94 NLB



NAME	TYPE	STATION	DAM AXIS OFFSET	TIP ELEV. IN FEET	MATERIAL TYPE	INSTALLATION FILL ELEV.	METHOD OF INSTALLATION (DETAIL)	REMARKS
VW-27	VIBRATING WIRE PIEZO	18+00	180 U/S	5634.0	OLD ALLUVIUM	5651.7	SINGLE PAIR VIBRATING WIRE/FND.	INSTALLED WITH VW-28. VWP Filter tip is high air entry. Spliced 10-06-92 @ Sta. 18+04, 38 ft. u/s, el. 5797 ft.
VW-28	VIBRATING WIRE PIEZO	18+00	180 U/S	5633.4	OLD ALLUVIUM	5651.7	SINGLE PAIR VIBRATING WIRE/FND.	INSTALLED WITH VW-27. VWP filter tip is high air entry.
VW-29	VIBRATING WIRE PIEZO	18+00	100 U/S	5674.3	RANDOM FILL II	5679.2	SINGLE PAIR VIBRATING WIRE/EMB.	INSTALLED WITH VW-30. Spliced 10-92 @ Sta. 18+00, 5 ft. d/s, el. 5810 ft.
VW-30	VIBRATING WIRE PIEZO	18+00	100 U/S	5675.1	RANDOM FILL II	5679.2	SINGLE PAIR VIBRATING WIRE/EMB.	INSTALLED WITH VW-29. Spliced 10-92 @ Sta. 18+00, 2 ft. d/s, el. 5810 ft.
VW-31	VIBRATING WIRE PIEZO	18+00	100 U/S	5635.8	CORE	5652.1	SINGLE PAIR VIBRATING WIRE/EMB.	INSTALLED WITH VW-32.
VW-32	VIBRATING WIRE PIEZO	18+00	100 U/S	5635.0	CORE	5652.1	SINGLE PAIR VIBRATING WIRE/EMB.	INSTALLED WITH VW-31.
VW-33	VIBRATING WIRE PIEZO	18+00	35 U/S	5567.0	BEDROCK, U/S FROM GROUT CURTAIN	5591.1	SINGLE PAIR VIBRATING WIRE/FND.	INSTALLED WITH VW-34.
VW-34	VIBRATING WIRE PIEZO	18+00	35 U/S	5566.4	BEDROCK, U/S FROM GROUT CURTAIN	5591.1	SINGLE PAIR VIBRATING WIRE/FND.	INSTALLED WITH VW-33.
VW-35	VIBRATING WIRE PIEZO	18+00	5 D/S	5726.4	CORE	5729.9	SINGLE PAIR VIBRATING WIRE/CORE	INSTALLED WITH VW-36.
VW-36	VIBRATING WIRE PIEZO	18+00	5 D/S	5725.6	CORE	5729.9	SINGLE PAIR VIBRATING WIRE/CORE	INSTALLED WITH VW-35.
VW-37	VIBRATING WIRE PIEZO	18+00	5 D/S	5666.1	CORE	5670.6	SINGLE PAIR VIBRATING WIRE/CORE	INSTALLED WITH VW-38.
VW-38	VIBRATING WIRE PIEZO	18+00	5 D/S	5665.3	CORE	5670.6	SINGLE PAIR VIBRATING WIRE/CORE	INSTALLED WITH VW-37.
VW-39	VIBRATING WIRE PIEZO	18+00	5 D/S	5615.9	CORE	5620.6	SINGLE PAIR VIBRATING WIRE/CORE	INSTALLED WITH VW-40. Spliced 11-18-92 @ approx. Sta. 15+90, Axis, 5810 ft.
VW-40	VIBRATING WIRE PIEZO	18+00	5 D/S	5615.2	CORE	5620.6	SINGLE PAIR VIBRATING WIRE/CORE	INSTALLED WITH VW-39. Spliced 11-18-92 @ approx. Sta. 15+90, Axis, 5810 ft.
VW-41	VIBRATING WIRE PIEZO	18+00	15 D/S	5566.0	BEDROCK, D/S FROM GROUT CURTAIN	5586.4	SINGLE PAIR VIBRATING WIRE/FND.	INSTALLED WITH VW-42. VWP filter tip is high air entry. Spliced 11-15-92 @ approx. Sta. 16+00, Axis, 5810 ft.
VW-42	VIBRATING WIRE PIEZO	18+00	15 D/S	5566.6	BEDROCK, D/S FROM GROUT CURTAIN	5586.4	SINGLE PAIR VIBRATING WIRE/FND.	INSTALLED WITH VW-41. VWP filter tip is high air entry. Spliced 11-15-92 @ approx. Sta. 16+00, Axis, 5810 ft.
VW-43	VIBRATING WIRE PIEZO	18+04	304 D/S	5611.2	OLD ALLUVIUM	5626.5	SINGLE VIBRATING WIRE WITH OPEN TUBE/FND.	INSTALLED WITH C-9. This instrument pair is not located in the same borehole as VW-44, C-10 as designed.
VW-44	VIBRATING WIRE PIEZO	18+02	306 D/S	5581.7	BEDROCK	5626.0	SINGLE VIBRATING WIRE WITH OPEN TUBE/FND.	INSTALLED WITH C-10.
C-8	OPEN TUBE PIEZO	18+00	305 D/S	5655.0	RANDOM FILL I	5655.0	SINGLE OPEN TUBE/ADDED IN EMB.	INSTALLED ALONE.
C-9	OPEN TUBE PIEZO	18+04	304 D/S	5610.0	OLD ALLUVIUM	5626.5	SINGLE VIBRATING WIRE WITH OPEN TUBE/FND.	INSTALLED WITH VW-43. Open tube spliced @ el. 5640.6 ft.
C-10	OPEN TUBE PIEZO	18+02	306 D/S	5580.5	BEDROCK	5626.0	SINGLE VIBRATING WIRE WITH OPEN TUBE/FND.	*** NON FUNCTIONAL *** - Open tube was damaged by settlement of the embankment during construction.
C-11	OPEN TUBE PIEZO	18+00	650 D/S	5620.0	OLD ALLUVIUM	5628.2	SINGLE OPEN TUBE/2 PER BOREHOLE/FND.	INSTALLED ALONE. Spliced 10-92 @ Instrument House IH-1.
C-12	OPEN TUBE PIEZO	18+00	650 D/S	5580.9	OLD ALLUVIUM	5628.2	SINGLE OPEN TUBE/2 PER BOREHOLE/FND.	INSTALLED ALONE.
I-12	INCLINOMETER	18+00	240 U/S	5580.0	BEDROCK	5656.2	INCLINOMETER	INSTALLATION OKAY.
I-13	INCLINOMETER	18+00	0	5560.0	BEDROCK	5585.3	INCLINOMETER	INSTALLATION OKAY. This inclinometer has only two 10 foot sections at bottom of hole. Spliced 04-21-92 @ elevation 5675.3 ft.
I-14	INCLINOMETER	18+00	300 D/S	5566.0	BEDROCK	5625.5	INCLINOMETER	INSTALLATION OKAY.
VW-72	VIBRATING WIRE PIEZO	19+00	250 U/S	5651.2	OLD ALLUVIUM	5662.1	SINGLE PAIR VIBRATING WIRE/FND.	INSTALLED WITH VW-73. Cables routed to Instrument House IH-2 through I-15 AT Sta. 20+50, 240 ft. U/S
VW-73	VIBRATING WIRE PIEZO	19+00	250 U/S	5650.6	OLD ALLUVIUM	5662.1	SINGLE PAIR VIBRATING WIRE/FND.	INSTALLED WITH VW-72. Cables routed to Instrument House IH-2 through I-15 AT Sta. 20+50, 240 ft. U/S
VW-74	VIBRATING WIRE PIEZO	19+00	250 U/S	5625.2	OLD ALLUVIUM	5662.1	SINGLE PAIR VIBRATING WIRE/FND.	INSTALLED WITH VW-75. Cables routed to Instrument House IH-2 through I-15 AT Sta. 20+50, 240 ft. U/S
VW-75	VIBRATING WIRE PIEZO	19+00	250 U/S	5625.8	OLD ALLUVIUM	5662.1	SINGLE PAIR VIBRATING WIRE/FND.	INSTALLED WITH VW-74. Cables routed to Instrument House IH-2 through I-15 AT Sta. 20+50, 240 ft. U/S

Notes:

1. All instrument cables routed in trenches are placed with approximately 10 feet of slack length for every 100 feet of trench.
2. The term "Connector Trench" refers to an excavated trench on the approximately horizontal fill surface to route the vibrating wire cables from the point of installation to the appropriate inclinometer instrument mound where they shall be advanced vertically with the fill.
3. The term "Upslope Trench" refers to an excavated trench on the final grade to route the vibrating wire cables from the instrument mound, upslope, to a manhole at the crest which shall serve as a junction for the cables and as an enclosure for an inclinometer located on the dam axis.
4. The term "Crest Trench" refers to an excavated trench on the dam crest prior to construction of the paved road to route the vibrating wire cables from the manhole junction(s) to one of the two permanent Instrument House enclosures.
5. Open Tube Piezometers C-18 thru C-21 are retrofitted with a 1/2" diameter Vibrating Wire Transducer for the purpose of remote sensing the water levels in these instruments from Instrument House IH-2. The method and timing for each installation shall be approved by the Government Representative in the field.

INSTRUMENT LEGEND

SYMBOL	INSTRUMENT TYPE
I-6	INCLINOMETER
C-1	OPEN TUBE PIEZOMETER
OW-1	OBSERVATION WELL
VW-2	VIBRATING WIRE PIEZOMETER
VW-11 C-2	VIBRATING WIRE AND OPEN TUBE PIEZOMETERS
	VIBRATING WIRE PIEZOMETER CABLE (LEADLINE) ROUTE

GRAPHIC SCALE

50 0 50 100 150 200 250 FEET

SCALE: 1" = 150 FEET

LITTLE DELL LAKE
SALT LAKE CITY STREAMS, UTAH

INSTRUMENTATION SECTION

STATION 18+00

DEPARTMENT OF THE ARMY
SACRAMENTO DISTRICT, CORPS OF ENGINEERS
SACRAMENTO, CALIFORNIA

SUBMITTED: MICHAEL D. RAMSBOTHAM

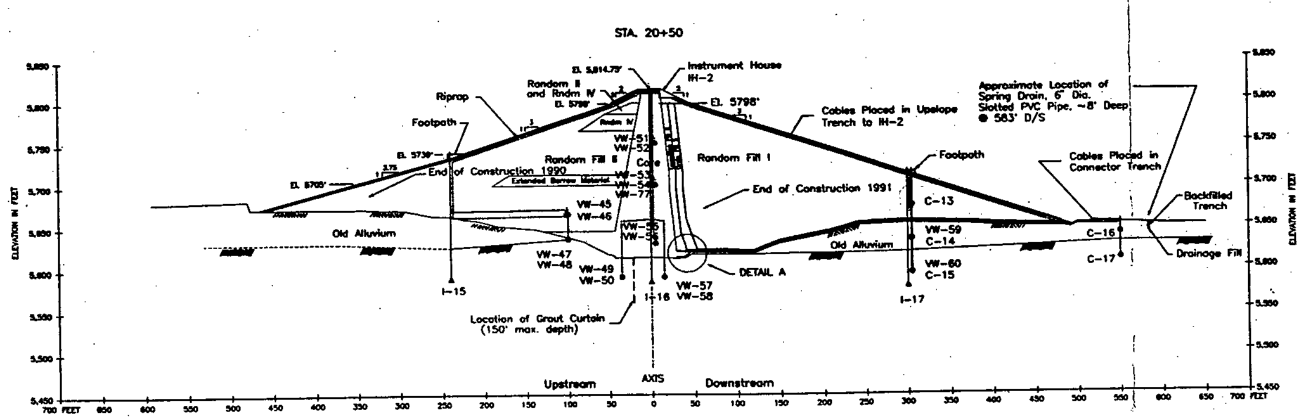
SUBMITTED: RESIDENT ENGINEER

J. ROADIFER | M. D. R

PLATE 45

LITTLE DELL PROJECT: PL-45 (LDIXE3RO.DWG) (EMB) 25 MAY 94 NLB

STA. 20+50



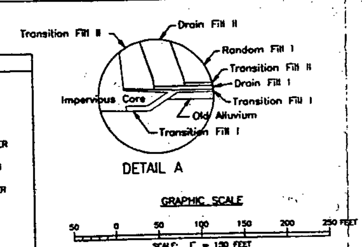
NAME	TYPE	STATION	DAM AXIS OFFSET	TIP ELEV. IN FEET	MATERIAL TYPE	INSTALLATION FILL ELEV.	METHOD OF INSTALLATION	REMARKS
VW-45	VIBRATING WIRE PIEZO	20+50	100 U/S	5665.8	RANDOM FILL II	5671.9	SINGLE PAIR VIBRATING WIRE/EMB.	INSTALLED WITH VW-46. Spliced 10-13-92 @ Sta. 20+54, 14 ft. u/s, el. 5808 ft.
VW-46	VIBRATING WIRE PIEZO	20+50	100 U/S	5665.0	RANDOM FILL II	5671.9	SINGLE PAIR VIBRATING WIRE/EMB.	INSTALLED WITH VW-45. Spliced 10-13-92 @ Sta. 20+55, 16 ft. u/s, el. 5808 ft.
VW-47	VIBRATING WIRE PIEZO	20+50	100 U/S	5636.7	OLD ALLUVIUM	5662.8	SINGLE PAIR VIBRATING WIRE/FND	INSTALLED WITH VW-48.
VW-48	VIBRATING WIRE PIEZO	20+50	100 U/S	5637.3	OLD ALLUVIUM	5662.8	SINGLE PAIR VIBRATING WIRE/FND	INSTALLED WITH VW-47.
VW-49	VIBRATING WIRE PIEZO	20+50	35 U/S	5593.4	BEDROCK, U/S FROM GROUT CURTAIN	5656.7	SINGLE PAIR VIBRATING WIRE/FND.	INSTALLED WITH VW-50.
VW-50	VIBRATING WIRE PIEZO	20+50	35 U/S	5592.8	BEDROCK, U/S FROM GROUT CURTAIN	5656.7	SINGLE PAIR VIBRATING WIRE/FND.	INSTALLED WITH VW-49.
VW-51	VIBRATING WIRE PIEZO	20+50	5 D/S	5753.0	CORE	5760.0	SINGLE PAIR VIBRATING WIRE/EMB.	INSTALLED WITH VW-52.
VW-52	VIBRATING WIRE PIEZO	20+50	5 D/S	5753.8	CORE	5760.0	SINGLE PAIR VIBRATING WIRE/EMB.	INSTALLED WITH VW-51.
VW-53	VIBRATING WIRE PIEZO	20+50	5 D/S	5700.1	CORE	5705.5	SINGLE PAIR VIBRATING WIRE/EMB.	INSTALLED WITH VW-54 AND IN CONJUNCTION WITH VW-77.
VW-54	VIBRATING WIRE PIEZO	20+50	5 D/S	5700.9	CORE	5705.5	SINGLE PAIR VIBRATING WIRE/EMB.	INSTALLED WITH VW-53 AND IN CONJUNCTION WITH VW-77.
VW-55	VIBRATING WIRE PIEZO	20+50	5 D/S	5630.6	CORE	5657.7	SINGLE PAIR VIBRATING WIRE/EMB.	INSTALLED WITH VW-56.
VW-56	VIBRATING WIRE PIEZO	20+50	5 D/S	5630.0	CORE	5657.7	SINGLE PAIR VIBRATING WIRE/EMB.	INSTALLED WITH VW-55.
VW-57	VIBRATING WIRE PIEZO	20+50	15 D/S	5590.9	BEDROCK, D/S FROM GROUT CURTAIN	5658.5	SINGLE PAIR VIBRATING WIRE/FND.	INSTALLED WITH VW-58.
VW-58	VIBRATING WIRE PIEZO	20+50	15 D/S	5590.3	BEDROCK, D/S FROM GROUT CURTAIN	5658.5	SINGLE PAIR VIBRATING WIRE/FND.	INSTALLED WITH VW-57.
VW-59	VIBRATING WIRE PIEZO	20+50	305 D/S	5636.2	OLD ALLUVIUM	5655.4	SINGLE VIBRATING WIRE WITH OPEN TUBE/FND.	INSTALLED WITH C-14.
VW-60	VIBRATING WIRE PIEZO	20+50	305 D/S	5596.3	BEDROCK	5655.4	SINGLE VIBRATING WIRE WITH OPEN TUBE/FND.	INSTALLED WITH C-15.
C-13	OPEN TUBE PIEZO	20+50	305 D/S	5675.0	RANDOM FILL I	5675.0	SINGLE OPEN TUBE/ADDED IN EMB.	INSTALLED ALONE.
C-14	OPEN TUBE PIEZO	20+50	305 D/S	5635.0	OLD ALLUVIUM	5655.4	SINGLE VIBRATING WIRE WITH OPEN TUBE/FND.	INSTALLED WITH VW-59.
C-15	OPEN TUBE PIEZO	20+50	305 D/S	5595.2	BEDROCK	5655.4	SINGLE VIBRATING WIRE WITH OPEN TUBE/FND.	INSTALLED WITH VW-60. Open tube piezometer damaged by settlement of the embankment. Retro. VWP is still functional but not removable.
C-16	OPEN TUBE PIEZO	20+50	550 D/S	5639.8	OLD ALLUVIUM	5653.2	MULTIPLE OPEN TUBE/TOE	INSTALLED ALONE. Spliced 11-14-92 @ Sta. 20+50, 8 ft. d/s, el. 5810 ft.
C-17	OPEN TUBE PIEZO	20+50	550 D/S	5610.3	BEDROCK	5653.2	MULTIPLE OPEN TUBE/TOE	INSTALLED ALONE. Spliced 11-14-92 @ Sta. 20+50, 13 ft. d/s, el. 5812 ft.
I-15	INCLINOMETER	20+50	240 U/S	5590.7	BEDROCK	5663.7	INCLINOMETER	INSTALLATION OKAY.
I-16	INCLINOMETER	20+50	0	5583.2	BEDROCK	5655.0	INCLINOMETER	INSTALLATION OKAY.
I-17	INCLINOMETER	20+50	300 D/S	5584.9	BEDROCK	5654.9	INCLINOMETER	INSTALLATION OKAY.
VW-77	VIBRATING WIRE PIEZO	20+55	5 D/S	5699.4	CORE	5760.0	HIGH AIR ENTRY FILTER; DIRECT BURIAL VWP	INSTALLED IN CONJUNCTION WITH VW-53, 54. For comparison of pore pressures between contract installation and direct burial methods.

Notes:

1. All instrument cables routed in trenches are placed with approximately 10 feet of slack length for every 100 feet of trench.
2. The term "Connector Trench" refers to an excavated trench on the approximately horizontal fill surface to route the vibrating wire cables from the point of installation to the appropriate inclinometer instrument mound where they shall be advanced vertically with the fill.
3. The term "Upslope Trench" refers to an excavated trench on the final grade to route the vibrating wire cables from the instrument mound, upslope, to a manhole at the crest which shall serve as a junction for the cables and as an enclosure for an inclinometer located on the dam Axis.
4. The term "Crest Trench" refers to an excavated trench on the dam crest prior to construction of the paved road to route the vibrating wire cables from the manhole junction(s) to one of the two permanent Instrument House enclosures.
5. Open Tube Piezometers C-18 thru C-21 are retrofitted with a 1/2" diameter Vibrating Wire Transducer for the purpose of remote sensing the water levels in these instruments from Instrument House IH-2. The method and timing for each installation shall be approved by the Government Representative in the field.

INSTRUMENT LEGEND

SYMBOL	INSTRUMENT TYPE
I-6	INCLINOMETER
C-1	OPEN TUBE PIEZOMETER
OW-1	OBSERVATION WELL
VW-2	VIBRATING WIRE PIEZOMETER
VW-11 C-2	VIBRATING WIRE AND OPEN TUBE PIEZOMETERS
	VIBRATING WIRE PIEZOMETER CABLE (LEADLINE) ROUTE



DETAIL A

GRAPHIC SCALE

50 0 50 100 150 200 250 FEET

SCALE: 1" = 150 FEET

LITTLE DELL LAKE
SALT LAKE CITY STREAMS, UTAH

INSTRUMENTATION SECTION

STATION 20+50

DEPARTMENT OF THE ARMY
SACRAMENTO DISTRICT, CORPS OF ENGINEERS
SACRAMENTO, CALIFORNIA

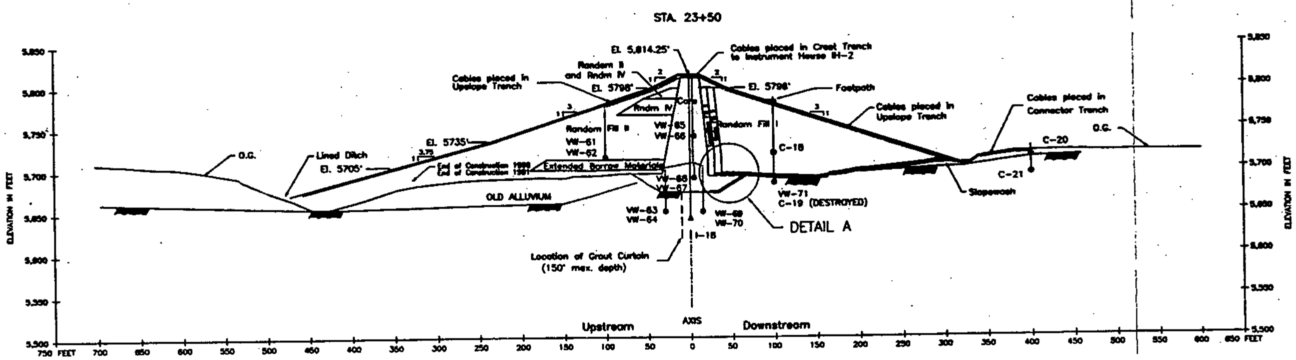
SUBMITTED: MICHAEL D. RAMSBOTHAM

SUBMITTED:

J. ROACHFER | M. D. R.

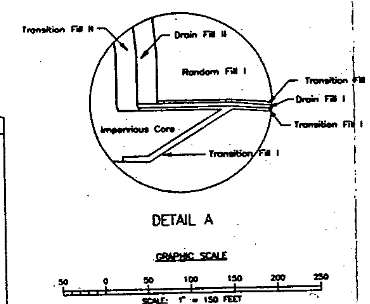
PLATE 46

LITTLE DELL PROJECT: PL-46 (LDIXE4RO.DWG) (EMB) 25 MAY 94 NLB



INSTRUMENT INFORMATION

NAME	TYPE	STATION	DAM AXIS OFFSET	TIP ELEV. IN FEET	MATERIAL TYPE	INSTALLATION FILL ELEV.	METHOD OF INSTALLATION (DETAIL)	REMARKS
VW-61	VIBRATING WIRE PIEZO	23+50	100 U/S	5716.2	RANDOM FILL II	5726.8	SINGLE PAIR VIBRATING WIRE/EMB.	INSTALLED WITH VW-62.
VW-62	VIBRATING WIRE PIEZO	23+50	100 U/S	5715.4	RANDOM FILL II	5726.8	SINGLE PAIR VIBRATING WIRE/EMB.	INSTALLED WITH VW-61.
VW-63	VIBRATING WIRE PIEZO	23+50	35 U/S	5651.1	BEDROCK, U/S FROM GROUT CURTAIN	5702.8	SINGLE PAIR VIBRATING WIRE/FND	INSTALLED WITH VW-64.
VW-64	VIBRATING WIRE PIEZO	23+50	35 U/S	5650.3	BEDROCK, U/S FROM GROUT CURTAIN	5702.8	SINGLE PAIR VIBRATING WIRE/FND	INSTALLED WITH VW-63.
VW-65	VIBRATING WIRE PIEZO	23+50	5 D/S	5741.5	CORE	5745.5	SINGLE PAIR VIBRATING WIRE/EMB.	INSTALLED WITH VW-66.
VW-66	VIBRATING WIRE PIEZO	23+50	5 D/S	5740.7	CORE	5745.5	SINGLE PAIR VIBRATING WIRE/EMB.	INSTALLED WITH VW-65.
VW-67	VIBRATING WIRE PIEZO	23+50	5 D/S	5690.0	CORE	5701.9	SINGLE PAIR VIBRATING WIRE/EMB.	INSTALLED WITH VW-68. Hole was drilled by driving casing through core. This caused extremely high localized pore pressures.
VW-68	VIBRATING WIRE PIEZO	23+50	5 D/S	5690.8	CORE	5701.9	SINGLE PAIR VIBRATING WIRE/EMB.	INSTALLED WITH VW-67. Hole was drilled by driving casing through core. This caused extremely high localized pore pressures.
VW-69	VIBRATING WIRE PIEZO	23+50	15 D/S	5650.8	BEDROCK, D/S FROM GROUT CURTAIN	5700.7	SINGLE PAIR VIBRATING WIRE/FND.	INSTALLED WITH VW-70.
VW-70	VIBRATING WIRE PIEZO	23+50	15 D/S	5650.0	BEDROCK, D/S FROM GROUT CURTAIN	5700.7	SINGLE PAIR VIBRATING WIRE/FND.	INSTALLED WITH VW-69.
VW-71	VIBRATING WIRE PIEZO	23+45	95 D/S	5681.0	BEDROCK	5719.2	SINGLE VIBRATING WIRE WITH OPEN TUBE/FND.	INSTALLED WITH C-19. This is the third VW-71 installed. Two installations were abandoned, one @ Sta. 23+50, 100 ft. d/s, and one @ Sta. 23+50, 95 ft. d/s.
C-18	OPEN TUBE PIEZO	23+50	100 D/S	5720.0	RANDOM FILL I	5720.0	OPEN TUBE PIEZO./ADDED IN EMB.	INSTALLED ALONE.
C-19	OPEN TUBE PIEZO	23+45	95 D/S	5679.7	BEDROCK	5719.2	SINGLE VIBRATING WIRE WITH OPEN TUBE/FND.	*** NON FUNCTIONAL *** – Open tube piezometer was damaged by settlement of the embankment during construction.
C-20	OPEN TUBE PIEZO	23+50	400 D/S	5714.3	COLLUVIUM	5720.6	OPEN TUBE PIEZO./2 PER BOREHOLE	INSTALLED ALONE.
C-21	OPEN TUBE PIEZO	23+50	400 D/S	5694.9	BEDROCK	5720.6	OPEN TUBE PIEZO./2 PER BOREHOLE	INSTALLED ALONE.
I-18	INCLINOMETER	23+50	0	5645.5	BEDROCK	5701.2	INCLINOMETER	INSTALLATION OKAY. This inclinometer only has 2 each 10 foot inclinometer sections at bottom of installation.



DETAIL A

INSTRUMENT LEGEND

SYMBOL	INSTRUMENT TYPE
I-6	INCLINOMETER
C-1	OPEN TUBE PIEZOMETER
OW-1	OBSERVATION WELL
VW-2	VIBRATING WIRE PIEZOMETER
VW-11 C-2	VIBRATING WIRE AND OPEN TUBE PIEZOMETERS
	VIBRATING WIRE PIEZOMETER CABLE (LEADLINE) ROUTE

Notes:

1. All instrument cables routed in trenches are placed with approximately 10 feet of slack length for every 100 feet of trench.
2. The term "Connector Trench" refers to an excavated trench on the approximately horizontal fill surface to route the vibrating wire cables from the point of installation to the appropriate inclinometer instrument mound where they shall be advanced vertically with the fill.
3. The term "Upslope Trench" refers to an excavated trench on the final grade to route the vibrating wire cables from the instrument mound, upslope, to a manhole at the crest which shall serve as a junction for the cables and as an enclosure for an inclinometer located on the dam Axis.
4. The term "Crest Trench" refers to an excavated trench on the dam crest prior to construction of the paved road to route the vibrating wire cables from the manhole junction(s) to one of the two permanent Instrument House enclosures.
5. Open Tube Piezometers C-18 thru C-21 are retrofitted with a 1/2" diameter Vibrating Wire Transducer for the purpose of remote sensing the water levels in these instruments from Instrument House IH-2. The method and timing for each installation shall be approved by the Government Representative in the field.

LITTLE DELL LAKE
SALT LAKE CITY STREAMS, UTAH

INSTRUMENTATION SECTION

STATION 23+50

DEPARTMENT OF THE ARMY
SACRAMENTO DISTRICT, CORPS OF ENGINEERS
SACRAMENTO, CALIFORNIA

SUBMITTED:		SUBMITTED:
MICHAEL D. RAMSBOTHAM		RESIDENT ENGINEER
DRAWN BY J. ROADIFER	CHECKED BY M. D. R.	PLATE 47

APPENDICES

APPENDIX I

EMBANKMENT SPECIFICATION

SECTION 02212

APPENDIX I

SECTION 02212

EMBANKMENT

SECTION 02212

EMBANKMENT

1. **SCOPE:** The work covered by this section consists of furnishing all plant, labor, and equipment and performing all operations in connection with preparing the dam embankment foundation and placing and compacting all of the dams permanent fills and backfills in accordance with the contract drawings and these specifications. Except for restricted, inaccessible or special zones within the embankment, the embankment will be constructed according to the procedures specified in this section. This section does not apply to other project fills and backfills beyond the dam's lines and grades.

2. **APPLICABLE PUBLICATIONS:** The following publications of the issues listed below, but referred to thereafter by basic designation only, form an integral part of this specification to the extent indicated by the references thereto. The procedures specified in the Engineer Manual (EM's) govern except as modified by the Contracting Officer.

2.1 Department of the Army, Corps of Engineers, Engineer Manual:

EM 1110-2-1906	Laboratory Soils Testing
EM 1110-2-1907	Soils Sampling
EM 385-1-1	Safety and Health Requirements Manual

2.2 American Society for Testing and Materials (ASTM) Publications:

C 33-84	Concrete Aggregates
C 117-87	Materials Finer than 75 Mm (No 200) Sieve in Mineral Aggregate By Washing
C 131-81 (R 1987)	Resistance to Abrasion of Small Size Coarse Aggregate by Use of the Los Angeles Machine
C 136-84	Sieve Analysis of Fine and Coarse Aggregate
C 535-81	Resistance to Abrasion of Large Size Coarse Aggregate by use of the Los Angeles machine.

D 75-82	Sampling Aggregates
D 422-63 (R 1972)	Particle Size Analysis of Soils
D 698-78	Moisture Density Relationships of Soil Aggregate Moistures Using 5.5 lb (2.49 kg) Rammer and 12-in (305 mm) Drop
D 1556-82	Test Method for Density of Soil in Place by the Sand-Cone Method
D 2216-80	Method for Laboratory Determination of Water (Moisture) Content of Soil Rock, and Soil Aggregate Mixtures.
D 2217-66	Wet Preparation of Soil Samples for Particle Size Analysis and Determination of Soil Constants
D 2487-83	Classification of Soil for Engineering Purposes
D 4220-83	Preserving and Transporting Soil Samples
D 4253-83	Maximum Index Density of Soils Using a Vibratory Table
D 4318-84	Liquid Limit, Plastic Limit, and Plasticity Index of Soils Method A
D 3740-80	Practice for the Evaluation of Agencies Engaged in the Testing and/or Inspection of Soil and Rock as Used in Engineering

3. **DEFINITIONS:**

3.1 The term embankment as used in these specifications is defined as the earth and rock fill portions of the dam structure and includes all types of compacted fill and backfill for the dam excepting the rock fill material (riprap and bedding) used for slope protection which is described in Section, STONE PROTECTION, and topsoil. All other project fills and backfills for structures, roads and utilities are covered in their appropriate SECTIONS: 02220 Excavation, Fill and Backfill for Structures, 02221 Excavation, Trenching and Backfilling for Utilities Systems and 02230 Excavation, Fill, Backfill and Preparation of Subgrade for Roadways.

3.2 Compacted fill includes all fill placed in layers and subjected to compactive effort. Engineered Fill/Backfill is a compacted fill/backfill. The types of compacted fill are:

3.2.1 Impervious Fill for the impervious core section of the embankment, as shown on the drawings.

3.2.2 Transition Fill I forming the horizontal transition fill below the Drainage Fill I horizontal pervious drain blanket as shown on the drawings.

3.2.3 Transition Fill II forming the vertical or inclined transition fill adjacent to and immediately downstream of the impervious core section and transition fill above the Drainage Fill I horizontal pervious drain blanket as shown on the drawings.

3.2.4 Drainage Fill I forming the horizontal pervious drainage blanket as shown on the drawings.

3.2.5 Drainage Fill II forming the vertical or inclined (chimney) drain as shown on the drawing.

3.2.6 Random Fill I which forms the downstream embankment shell as shown on the drawings.

3.2.7 Random Fill II which forms the upstream embankment shell as shown on the drawings.

3.2.8 Random Fill III (optional) which shall be placed in the outermost portion of the upstream shell as shown on the drawings, at the contractor's option and approval of the Contracting Officer.

3.3 Backfill, as used in this SECTION (02212), is defined as satisfactory excavation refill or embankment fill which (1) is within 4 feet in any direction of structures, (2) cannot be placed around or adjacent to a structure until the structure is completed (3) is a zoned type of material, or (4) material placed in trenches and other restricted areas, such as excavations for record samples, that cannot be compacted by the specified, normal procedure for embankment fill.

3.4 Satisfactory Materials: In general materials classified by ASTM D 2487 as GW, GP, GC, GM, SW, SP, SC, SM, CL, and ML (including dual classifications) are considered satisfactory for fill and backfill. Embankment fills as specified in the following paragraph 5 MATERIALS, are satisfactory materials. Classification of materials is not a function of its moisture content. The Contractor shall be responsible for moisture conditioning (drying or wetting) fill/ backfill material to the specified moisture content for compaction.

3.5 Unsatisfactory Materials: Unsatisfactory materials are those materials classified by ASTM D 2487 as CH, MH, OL, and OH. In addition, all organics, biodegradable material, debris, and contaminated soil is unsatisfactory. Unsatisfactory materials shall be wasted, except that CH materials can be used in special cases as directed by the Contracting Officer. Topsoil is considered unsatisfactory for fill and backfill except as designated on the drawings. Classification of material is not a function of its moisture content.

3.6 Topsoil: Topsoil is that organic and nutrient enriched soil, free of roots and stones greater than 2 inches that is capable of supporting vegetation. Topsoil generally exists as the surficial and near surface (0 to 1.5 feet max) black site soil (clay and silt).

3.7 Percent Compaction: Percent or degree of compaction is a percentage of the maximum dry density obtained by the standard compactive effort as presented in ASTM D 698 Method B or D and EM 1110-2-1906 Appendix VI or VIA. If procedures conflict, the EM governs.

4. **GENERAL PROVISIONS:**

4.1 Lines and Grades: The embankment shall be constructed to the lines, grades and cross sections indicated on the drawings, unless otherwise directed by the Contracting Officer. The Government reserves the right to increase or decrease the foundation widths or the embankment slopes or make such other changes in the embankment sections as may be deemed necessary to produce a safe structure. The end slopes and side slopes of partial fill sections shall not be steeper than one vertical on three horizontal, (1V: 3H). The embankment shall be over-built at least one ft and cutback or compacted to form a compacted surface then track walked before placing riprap bedding or topsoil.

4.2 Conduct of Work: The Contractor shall provide for the care and diversion of surface water and ground water such that permanent construction is performed in areas free of water. Excavation shall be performed so that the site and the areas affecting operations at the site are continually and effectively drained. Control measures shall be taken to protect the integrity of the insitu foundation material. The Contractor shall maintain and protect the embankment in a satisfactory condition at all times until final completion and acceptance of all work under the contract. If as determined by the Contracting Officer the hauling equipment causes horizontal shears or slicken sides, rutting, quaking, heaving, cracking or excessive deformation of the embankment, the Contractor shall limit the type, load or travel speed of the hauling equipment on the embankment. Any approved embankment material which is lost in transit or rendered

unsuitable after being placed in the embankment and before final acceptance of the work, shall be replaced by the Contractor in a satisfactory manner and no additional payment will be made therefore. The Contractor shall excavate and remove from the embankment any material which the Contracting Officer considers objectionable and shall also dispose of such material and refill the excavated area as directed, all at no cost to the Government. The Contractor may be required to remove, at his own expense, any embankment material placed outside of prescribed slope lines. The Contractor will be responsible for Construction Quality Control as specified in paragraph 14, CONTRACTOR QUALITY CONTROL of this SECTION, 02212 - EMBANKMENT.

4.2.1 Approval and acceptance testing of the embankment and materials will be conducted by the Government on the embankment after compaction. Refer to paragraph 15 GOVERNMENT ACCEPTANCE TESTING. During the course of construction, the Government will regularly and continuously perform acceptance sampling and testing of materials. The Government will make every effort to minimize the impact on the Contractors operation. However, if necessary the Contractor shall cease or vary his operation as required or directed so that the Government sampling may be performed without interruption.

4.3 Haul Roads: Haul roads shall be located and constructed as approved by the Contracting Officer. They shall be designed to maintain the intended traffic, sloped to drain surface water and be maintained in good condition throughout the contract period, unless otherwise directed by the Contracting Officer. Haul roads within the contact area between the embankment and its foundation and abutments shall be removed and the area shall be treated as specified in paragraph 6, Preparation of Foundation, Partial Fill Surfaces and Abutments. Haul roads can not be built across the face of the dam without the approval of the Contracting Officer. If approved by the Contracting Officer haul roads across the face of the embankment shall be completely removed and the embankment restored to meet the requirements of the underlying fill. At all project locations, all visible evidence of the haul roads shall be obliterated by the end of construction.

4.4 Stockpiling from Approved Borrow Sources: When the excavation from approved borrow sources progresses at a faster rate than placement in the fill is being accomplished, such excavated material shall be stockpiled at approved locations adjacent to the work until its use is authorized. No payment will be made for such stockpiling nor for the reloading and hauling of this material to its final position in the embankment.

4.5 Placement Milestones: The rate of placement of embankment materials shall be such that the embankment is constructed to at

least elevation 5665.0 ft by 1 August 1990 and elevation 5705 ft. by 1 November 1990 as shown on the drawings. If the minimum embankment section can not be completed by the deadline, the Contractor shall excavate and riprap a notch through the embankment as directed by the Contracting Officer. The following construction season the Contractor shall remove the riprap, repair any damage and rebuild the excavated notch. The cost of constructing, protecting, repairing and rebuilding the notch shall be entirely paid for by the Contractor. The dam shall be completed to full height by 18 October 1991.

4.6 Coordination with Grouting: It shall be the Contractor's responsibility to complete all grouting operations in such a manner and at such time that will not interfere with placement of embankment materials or other elements of the job. All foundation grouting shall be completed within 200 feet of drain blanket placement unless otherwise approved by the Contracting Officer.

4.7 Equipment: All equipment to be used in constructing the dam embankment must be approved by the Contracting Officer prior to use. Submit equipment specifications, catalog cuts and weigh bills at least 7 days prior to delivering equipment to the site. Approval is contingent on the continued satisfactory operation of the equipment.

5. **MATERIALS:**

5.1 General: Exclusive of Random III material, the origin of any fill material in no way determines where it may be used in the embankment.

Materials for embankment fills shall be secured from required excavations, from the borrow areas indicated on the drawings, or from a commercial source approved by the Contracting Officer. Materials containing brush, roots, sod or other biodegradable materials will not be considered suitable. Unless approved for special use all soil classifying as CH, MH, OL and OH are unsatisfactory. The material for each of the several zones in the embankment shall meet the requirements as described below. The suitability of materials shall be subject to the approval of the Contracting Officer and their disposition in the embankment will be as approved by the Contracting Officer. The borrow operation is the responsibility of the Contractor. Selective excavating, moisture conditioning, removing oversize stones and mixing and blending of materials during the excavating process at the borrow area will be required. Ripping may be required to excavate or aerate the borrow soils and a grizzly, rock rake or other methods shall be required to remove cobbles and boulders greater than the maximum allowable size, (Impervious = 6 inches, Random = 8 inches).

5.2 Impervious FIll: Material for compacted impervious fill shall consist of clays, (CL) or silt (ML). It shall contain not less than 50 percent by weight of material passing a standard No. 200-sieve screen and the maximum dimension of material shall not exceed 6 inches. Fat clay (CH) or silt (MH) shall be wasted except as directed by the Contracting Officer for special uses. Clay (CL and CH) with a minimum 70% passing the No. 200 sieve shall be placed in the bottom 3 feet of the core, (i.e. from the approved surface to an elevation 3 ft. higher at all locations).

5.3 Transition Fill I: Transition fill shall be composed of sound, durable subangular to angular particles. Transition fill shall be free from any objectionable coating and not more than 5 percent of the material, by weight, shall pass a standard No. 200 sieve and shall meet the following gradation limits as compacted in place. Transition Fill I shall also have a percentage of wear not to exceed 50 percent after 500 revolutions in accordance with ASTM C 131.

Sieve Size	Percent by Weight, Passing
1½"	100
3/4"	90-100
3/8"	86-100
No. 4	72-100
No. 10	55-82
No. 20	38-64
No. 40	25-51
No. 100	3-20
No. 200	0-5

All points on individual grading curves obtained from representative samples of transition fill material shall lie between the boundary limits as defined by smooth curves drawn through the tabulated grading limits plotted on a mechanical analysis diagram. The individual grading curves within these limits shall not exhibit abrupt changes in slope denoting skip grading, scalping of certain sizes or other irregularities which would be detrimental to the proper functioning of the transition fill.

5.4 Transition Fill II: Transition fill shall be composed of sound, durable subangular to angular particles. Transition fill shall be free from any objectionable coating and not more than 15 percent of the material, by weight shall pass a standard No. 200 sieve and shall meet the following gradation limits as compacted in place. Transition Fill II shall also have a percentage of wear not to exceed 50 percent after 500 revolutions in accordance with ASTM C 131.

Sieve Size	Percent by Weight, Passing
1½"	100
3/4"	90-100
3/8"	86-100
No. 4	72-100
No. 10	55-82
No. 20	38-64
No. 40	25-51
No. 100	3-30
No. 200	0-15

All points on individual grading curves obtained from representative samples of transition fill material shall lie between the boundary limits as defined by smooth curves drawn through the tabulated grading limits plotted on a mechanical analysis diagram. The individual grading curves within these limits shall not exhibit abrupt changes in slope denoting skip grading, scalping of certain sizes or other irregularities which would be detrimental to the proper functioning of the transition fill.

5.5 Random Fill I Downstream Section of Dam: Random Fill I shall be satisfactory material. Material for compacted random fill in the downstream section of the dam shall consist of any or all types of satisfactory material which, from the standpoint of workability, trafficability, rolling and compaction are suitable for use in the dam embankment. The maximum particle dimension shall be 8 inches. Soft weathered rock, which breaks up under rolling to form essentially a soil and which compacts without excessive voids, may be used for random fill, if approved by the Contracting Officer. Layers or zones of cobbles with voids will not be permitted.

5.6 Random Fill II Upstream Section of Dam: Material for compacted random fill in the upstream section of the dam shall consist of satisfactory material classifying as GC, GM, GW, GP, SC, SM, SW, or SP with a minimum of 30 percent gravel. The maximum particle dimension of the material permitted in the random fill in the upstream section of the dam shall not exceed 8-inches. Layers or zones of cobbles with voids, fines or material not meeting the specified gradation will not be permitted. All Random II material shall meet the following gradation:

Sieve Size	Percent by Weight, Passing
8"	100
3"	80-100
1"	55-100
3/8"	35-100
No. 4	20-70
No. 10	15-65
No. 40	10-55
No. 200	0-45

5.7 Random Fill III Optional: At the option of the Contractor and the approval of the Contracting Officer Random Fill III may be borrowed from the alternate borrow area shown on the drawings. This material may be used when the reservoir borrow material is too wet to be conditioned to meet the specified moisture content for compaction during long periods of inclement weather or during early spring or late fall early morning or night time placement operations. It is noted that it may be necessary to use this source to ensure meeting the placement milestones/completion schedule. However, the Contractor is warned that excavation in the reservoir borrow area must continue in order to ensure the existing stockpiles (319.000 cy) and at least an additional 4.8 million cy (5.12 million cy total) of material are removed from the reservoir borrow area. Material excavated in excess of that required in the embankment shall be wasted or used in areas outside the reservoir. Restoration of the alternate borrow area is required. Refer to the drawings for details. Material for compacted Random fill III shall consist of satisfactory material classifying as GC, GM, GP, GW obtained from the Wanship-Echo Canyon Conglomerate in the alternate borrow area. The maximum particle dimension shall not exceed 8 inches. Layers or zones of cobbles with voids, fines or material not meeting the specified gradation will not be permitted. All Random III material shall meet the following gradation.

Sieve Size	Percent by Weight, Passing
8"	100
3"	80-100
1"	55-80
3/8"	35-65
No. 4	20-50
No. 10	15-45
No. 40	10-40
NO. 200	0-35

5.8 Drainage Fill I Horizontal (Blanket) Drain Within the Dam: Drainage Fill I material shall be composed of crushed stone, crushed gravel, angular sand, or other approved materials processed and blended or naturally combined. The material shall consist of durable, sound angular particles free from clay, organic matter, objectionable coating and other foreign substances. Drainage Fill I shall also have a percentage of wear not to exceed 40 percent after 500 revolutions in accordance with ASTM C 131. The amount of flat and elongated particles shall not exceed 15 percent. A flat particle is one having a width to thickness ratio greater than 3 and an elongated particle is one having a length to width ratio greater than 3. Materials retained on each sieve specified shall contain at least 85 percent by weight of crushed pieces having two or more freshly fractured faces with the area of each face being at least equal to 75 percent of the smallest midsectional area of the piece. When

two fractures are adjacent, the angle between the planes of the fractures must be at least 30 degrees to count as two fractured faces. After placing and compaction, the material shall fall between the gradation limits specified below:

Sieve Size (1)	Percent by Weight, Passing
1½"	100
1"	95-100
3/4"	60-100
½"	25-75
3/8"	17-55
No. 4	0-10
No. 8	0-5

NOTE (1)

ASTM C 33 Concrete Aggregates Size Number 57 (1" to No. 4) or 67 (3/4" to No. 4) will fit these gradation limits.

All points on individual grading curves obtained from representative samples of drainage fill material shall lie between the boundary limits as defined by smooth curves drawn through the tabulated grading limits plotted on a mechanical analysis diagram. The individual grading curves within these limits shall not exhibit abrupt changes in slope denoting skip grading, scalping of certain sizes or other irregularities which would be detrimental to the proper functioning of the drainage fill.

5.9 <u>Drainage Fill II Inclined (Chimney) Drain Within the Dam</u>: Drainage Fill II material shall (1) be composed of sound, durable, subangular to angular particles (2) contain no organic matter, objectionable coating, foreign substances or soft, friable particles, and (3) consist of sand, gravel, or crushed stone.

Drainage Fill II shall have a percentage of wear not to exceed 50 percent after 500 revolutions in accordance with ASTM C 131 and ASTM C 535. The amount of flat and elongated particle shall not exceed 30 percent. Refer to paragraph 5.8 for definition of flat or elongated. After placing and compaction, the material shall fall between the gradation limits specified below:

Sieve Size	Percent by Weight, Passing
4"	100
1½"	65-100
3/4"	35-100
3/8"	15-75
No. 4	0-50
No. 8	0-25
No. 16	0-5

All points on individual grading curves obtained from representative samples of drainage fill material shall lie between the boundary limits as defined by smooth curves drawn through the tabulated grading limits plotted on a mechanical analysis diagram. The individual grading curves within these limits shall not exhibit abrupt changes in slope denoting skip grading, scalping of certain sizes or other irregularities which would be detrimental to the proper functioning of the drainage fill.

5.10 Backfill: Backfill shall consist of satisfactory material of a type and quality conforming to that specified for the adjacent contiguous embankment fill material, unless otherwise directed by the Contracting Officer. Trench backfill for instrumentation lines and risers shall consist of clay with no more than 2 percent retained on the No. 4 sieve. Fat clay (CH) may be used for this application. Refer also to Section 13210 INSTRUMENTATION FOR DAM EMBANKMENT.

6. PREPARATION OF FOUNDATION, PARTIAL FILL SURFACES AND ABUTMENTS:

6.1 General: These paragraphs pertain to preparation of foundation areas. The core trench invert foundation requires special treatment as specified in SECTION: 02219 FOUNDATION PREPARATION CORE TRENCH. This section also applies to embankment fill which deteriorates due to exposure to the weather.

6.2 Earth: After excavation or stripping of the embankment foundation to the extent indicated on the drawings or otherwise required, the sides of stump holes, pits, and other similar cavities or depressions shall be excavated so as to flatten out the side slopes, and the sides of the cut or hole shall be scarified to provide bond between the foundation material and the fill. Unless otherwise directed, each depression shall be filled with embankment fill material dependent upon the type of material which is to be placed immediately above the foundation. The fill shall be placed in layers, moisture conditioned and compacted in accordance with the applicable provisions of paragraphs 7, 8 and 9. Materials which cannot be adequately compacted by roller equipment because of inadequate clearances shall be spread in maximum 4-inch thick layers and compacted with power tampers to an extent equal to that of the contiguous adjacent embankment fill material, i.e. a minimum 95% compaction. After filling of depressions and immediately prior to placement of compacted fill in any section of the embankment, the foundation of such section shall be loosened and mixed thoroughly by scarifying, plowing, discing or harrowing to a minimum depth of 6 inches, and the moisture content shall be adjusted to the amount specified in paragraph 8 for the appropriate type of material, except in areas where this requirement is waived by the Contracting Officer.

Unless approved by the Contracting Officer equipment with ripper teeth set farther than 6 inches apart shall not be allowed for scarifying. After removal of the roots, unsatisfactory material or other debris turned up in the process of loosening, the entire surface of the embankment foundation area shall be compacted by six (6) complete coverages of the compaction equipment as hereinafter specified for the appropriate type of fill. Except that the streambed alluvium left in place shall be compacted with a minimum 8 passes of the 10T vibratory roller with the applied total load of 60,000 lbs. Any unstable zones identified by the foundation rolling shall be immediately brought to the attention of the Contracting Officer. Unstable zones shall receive additional moisture conditioning and compaction or be over excavated. Unsatisfactory material identified shall be excavated and wasted. Prior to placement of compacted fill on or against the abutments and core trench side walls, the existing slopes shall be notched into (i.e. stepped, benched) and scarified and moisture conditioned to assure adequate bonding between the foundation and embankment materials. Notching or stepping shall not exceed 12 inch vertical steps. Prior to placement of compacted fill on or against the surfaces of any partial fill section, all soft or loose material, all material containing cracks or gullies, and all material that does not meet minimum density and moisture requirements or conform with the specified zoning of the embankment shall be removed. The remaining surface of the partial fill shall be loosened by scarifying, plowing, discing or harrowing to a minimum depth of six (6) inches, and the moisture content shall be adjusted as specified in paragraph 8 for the appropriate type of material. The surface of the partial fill section upon which fill is to be placed shall then be compacted as hereinafter specified for the appropriate type of fill. No separate payment will be made for loosening, moisture conditioning and rolling the foundation area, the abutment area, or the surfaces of partial fill sections, but the entire cost thereof shall be included in the applicable contract price for fill.

6.3 <u>Rock</u>: All moderately weathered to unweathered, moderately hard to very hard rock surfaces upon which or against which embankment materials are to be placed shall be cleaned to remove all soil, broken rock and debris. Those portions of such rock surfaces where, in the opinion of the Contracting Officer, the compaction of the embankment materials cannot be accomplished satisfactorily with power tampers, rubber tired front end loaders or other specified compaction equipment, shall be filled with dental concrete as directed to the extent necessary to permit satisfactory use of the compaction equipment. Preparation of rock surface and concrete placement shall be in accordance with Section 02219 FOUNDATION PREPARATION CORE TRENCH. In no case shall a thin coat of concrete be left on smooth, intact rock surfaces. Prior to fill placement all rock surfaces shall be moistened to receive the fill.

6.4. "Weathered" Rock: Severely to completely weathered moderately soft to very soft rock surfaces shall be treated similar to soil surfaces as specified in Paragraph 6.2 Earth.

7. PLACEMENT OF EMBANKMENT MATERIALS:

7.1 General: As part of the Quality Control (QC) program, the Contractor shall be responsible for controlling material conformance, lift thickness moisture conditioning and compactive effort (roller passes). Quality Assurance (QA) and acceptance testing will be performed by the Government. No fill shall be placed on any part of the embankment foundation until such areas have been inspected and approved. The gradation and distribution of materials throughout the compacted earth-fill sections of the dam shall be such that the embankments will be free from lenses, pockets, streaks, and layers of material differing substantially in texture or gradation from surrounding material of the same class. Successive loads of material shall be dumped at locations on the fill as directed or approved by the Contracting Officer. Travel by heavy hauling and compacting equipment will be restricted to a distance greater than four (4) feet from structures, and hauling equipment will be dispersed throughout the fill as directed to avoid heavy concentration of loads in any one area. Within restricted areas or areas where heavy compaction equipment cannot be used, the material shall be compacted by hand with power tampers. Contact with the abutments shall be made by ramping the fill up to the abutment contact on a slope of 10 horizontal to 1 vertical so that compaction equipment may work close to the abutment. Wheel rolling the abutment to fill contact with heavy rubber tired construction equipment such as a front end loader or loaded dump truck will be required.

7.2 Rate of Placement: Unless otherwise approved by the Contracting Officer, fill placement shall start at the lowest foundation elevation. Except at the abutment contacts or where the embankment is sloped to drain, the embankment working surface shall be maintained at approximately the same level regardless of the number of types of materials being placed. Placement of the transition and drain materials shall precede the placement of adjacent material by one (1) lift thickness or other approved methods to prevent contamination of the transition and drainage fill. The rate of placement of materials in the embankment section shall be scheduled so that the embankment is constructed full width to Elevation 5665.0 feet by 1 August 1990 and the upstream portion to Elevation 5705.0 feet by 1 November 1990, as shown on the drawings. The embankment shall be completed by 18 October 1991. However, if at any time during the course of construction the stability of the embankment becomes suspect (as evidenced by the dam instrumentation readings), the Contracting Officer may require the rate of fill placement be reduced. In an extreme case embankment placement may be temporarily suspended. If it is determined that the embankment instability is the

result of non-compliance with the plans and specification the Contractor shall be liable.

7.3 Cold Weather Placement: Although construction schedules may necessitate the placement of permanent fill or backfill during or immediately after or prior to freezing weather, every effort should be made to schedule placement of fill and backfill in periods of favorable weather. All fill and backfill placement shall cease when the air temperature is below 25°F or the temperature of the fill soil being compacted is below 33°F. When the air temperature is between 25°F and 35°F construction methods shall be modified to protect the fill material from freezing. Cold weather construction procedures shall be developed by the Contractor and submitted to the Contracting Officer for approval. Cold weather placement and compaction of embankment material will not be allowed without an approved plan. Fill shall not be placed on a frozen surface nor shall snow, ice, or frozen soil be incorporated into the embankment.

7.4 Spring Start Up/Winter Shut Down: At the beginning of each construction season all permanent fill and backfill materials or foundation surfaces that have deteriorated over the winter months shall be prepared to receive fill. Preparation of the surfaces shall be in general accordance with Paragraph 6, PREPARATION OF FOUNDATION, PARTIAL FILL SURFACES AND ABUTMENTS and the cost thereof shall be included in the applicable contract price for fill. At the end of the construction season the contractor shall "seal off" the last lift with a minimum 2 passes of a smooth drum or rubber tired roller. In addition, the Contractor shall take those measures necessary to protect all permanent work and control runoff and erosion. Particular attention must be placed on protecting the transition and drainage fills from contamination. The exposed transition and drainage fill layers shall be covered by a minimum 10 mil impervious sheet that extends laterally at least 5 ft beyond the edges of the exposed drainage and transition fill with a minimum 12 inch thick soil layer over the sheet, and the adjacent fill shall be sloped to ensure surface run off flows away from the drainage fill. The embankment working surface shall be sloped to drain up to a maximum 3% slope.

7.5 Impervious Fill: Impervious Fill shall be placed in the impervious section of the embankment and in the core trench. In general, the more impervious materials shall be placed toward the center of the impervious section of the dam and the less impervious materials toward the outer zones of the core. In general the more fines (material passing the No. 200 sieve) the more impervious a material becomes. As directed by the Contracting Officer, clay (CL and CH) with a minimum 70% passing the No. 200 sieve shall be placed in the bottom 3 feet of the core, at a moisture content range of minus 1% to plus 1% of optimum. Where the foundation received dental mortar or concrete the initial 18

inches of fill shall be placed and compacted with rubbertired equipment or <u>a pad foot type compactor</u> as directed by the Contracting Officer.

7.6 <u>Transition Fill</u>: Transition Fill I and II shall be placed in the dam embankment as shown on drawings. Surveys (horizontal and vertical) and other means, as approved by the Contracting Officer, shall be used by the contractor to verify the required thickness of transition fill. The finished surface shall be smooth with an allow-able tolerance of not more than zero (0) inches under or 2 inches over the indicated thickness.

7.7 <u>Random Fill</u>: Random Fill I, II and III shall be placed in the random sections of the embankment. Except as specified below, limits of random sections shown on the drawings indicate the maximum extent of random material. When approved, pervious material may be substituted for random material in areas where random zones adjoin or abut pervious zones. In general, the more impervious of the random material shall be placed toward the impervious core or horizontal drain blanket and the more pervious of the random material shall be towards the outer edge of the random zones so that a transition in permeability is effected from the impervious section to the outer portions of the embankment.

7.8 <u>Drainage Fill</u>: Drainage Fill I and II material shall be placed in the embankment in the manner herein described and to the lines and grades indicated on the plans. Surveys, horizontal and vertical and other means, as approved by the Contracting Officer, shall be used by the Contractor to verify the required thickness of drainage fill. The finished surface shall be smooth with an allowable tolerance of zero (0) minus to plus three (3) inches.

7.9 <u>Spreading</u>: The Contractor shall be responsible for controlling the lift thickness, moisture conditioning, materials conformance and compactive effort. Designated, experienced and approved grade setters shall continuously control lift thickness with survey methods (level and rod) unless other means are approved by the Contracting Officer. Lift thickness determinations shall not be left to equipment operators. Additional personnel shall be provided to monitor compactive effort (record roller passes), and material and moisture tests shall be performed as required in Paragraph 14, CONTRACTOR QUALITY CONTROL.

7.9.1 <u>After dumping</u>, the embankment materials may be initially spread by bulldozers or other approved equipment in approximately horizontal layers over the entire fill areas. Final spreading of embankment materials to the required lift thickness shall be accomplished with the motor patrol/grader specified in Paragraph 9.1.8 Motorgraders. Unless otherwise

directed the maximum loose lift thickness and moisture content after compaction shall be as specified in TABLE 1.

TABLE 1

Material	Max Loose Lift Thickness	Compacted Moisture Content With Respect to the Opt. Moisture
Impervious Fill (Core)	8"	-3% to +1% (1)
Transition Fill I	12"	-2% to +1%
Transition Fill II	12"	-2% to +1%
Random Fill-I		
Coarse Grained (GC,SC,etc.)	12"	-3% to +1%
Fine Grained (CL,ML)	8"	-3% to OMC
Random Fill II	12"	-3% to +1%
Random Fill III	12"	-3% to +1%
Drainage Fill I	12"	2 gal/yd2/lift(MAX)
Drainage Fill II	12"	2 gal/yd2/lift(MAX)
Backfills	6"	-2% to +1%

Note: (1) Bottom 3 ft. of Impervious core placed at minus 1% to plus 1% OMC.

As soon as practicable after commencement of construction of any section of the embankment, the central portion thereof shall be raised or crowned with grades not to exceed 3 percent so that the surface of the fill will drain freely and shall be so maintained throughout construction. If the compacted surface of any layer of material, exclusive of transition and drainage fill is determined to be too smooth to bond properly with the succeeding layers, it shall be loosened by discing, or other approved method, before the succeeding layer is placed thereon. During the dumping and spreading processes, the Contractor shall maintain at all times a force of men adequate to remove all roots and debris from all embankment materials and all stones of greater than 6 inches in maximum dimension from the impervious core and greater than 8 inches in maximum dimension from other random embankment zones. Over-size stone, roots and debris shall be continuously removed from the embankment and disposed of in the waste area. The entire surface of any section of the embankment under construction shall be maintained in such condition that construction equipment can travel on any part of any one section, and that travel over these zones shall be routed to distribute the compactive effort as much as possible. Ruts in the surface of any layer shall be scarified and filled satisfactorily before compacting. Rolling of embankment shall be as approved by the Contracting Officer but, in general, shall be parallel to the dam axis.

8. MOISTURE CONTROL: The materials in each layer of the fill shall contain the amount of moisture, within the limits specified

below and in Table 1 or as directed by the Contracting Officer, necessary to obtain the desired compaction as determined by the Contracting Officer. Material that is not within the specified limits after compaction shall be reworked, regardless of density. The Contractor shall be responsible for obtaining water for moisture conditioning fill, dust control and other construction purposes. Optimum moisture content (OMC) will be determined by the Contracting Officer based on the result of standard compaction testing (ASTM D 698 and EM 1110-2-1906 Appendix VI VIA) performed on the materials being placed in the embankment. The OMC is not a fixed value but is a function of the material and as such it will vary as materials vary. Moisture conditioning shall be accomplished at the source before materials are brought to the embankment. Moisture conditioning on the embankment shall be minimized. If necessary moisture conditioning of materials on the embankment shall be conducted as required in the following paragraphs 8.1 Impervious and Random Fill.

8.1 Impervious and Random Fill: The moisture content after compaction shall be uniform throughout any one layer of impervious or random fill materials. With the exception of fine grained Random Fill I material placed in the downstream shell and the bottom 3 ft. of the Impervious (core) Fill the moisture content after compaction shall be within the limits of 1 percentage point above optimum and 3 percentage points below optimum moisture content as determined by the Contracting Officer. Fine grained Random Fill I material (i.e., CL, ML) placed in the downstream shell shall be restricted to a moisture content after compaction within the limits of optimum moisture content to 3 percentage points below optimum moisture. The bottom 3 ft. of Impervious Fill placed in the core trench shall be placed within a moisture content range of minus 1% to plus 1% of the optimum moisture content. Material that is too wet shall be spread on the embankment and permitted to dry, assisted by discing or harrowing, until the moisture content is reduced to an amount within the specified limits. When the material is too dry, the Contractor will be required to add moisture to each layer on the fill. Discing will be required to work the moisture into the material until a uniform distribution of moisture is obtained. Discing shall be full depth in the lift being mixed. Discing required for moisture conditioning shall be in addition to the two to four passes required in paragraph 9.2 Impervious and Random Fill for blending and breaking. Water applied on a layer of fill shall be accurately controlled in amount so that free water will not appear on the surface during or subsequent to rolling. Should too much water be added to any part of the embankment, so that the material is too wet to obtain the desired compaction, the rolling on that section of the embankment shall be delayed until the moisture content of the material is reduced to an amount within the specified limits. If it is generally impracticable to obtain the specified moisture content by wetting or drying the material on the fill, the Contractor shall be

required to adjust moisture contents in the borrow areas or at the source of excavation. If the top or contact surfaces of a fill section becomes too dry (outside specified compaction moisture for the material) to permit suitable bond between these surfaces and the fill to be placed thereon, the Contractor shall (1) loosen the dried materials by scarifying or discing to such depths as may be directed by the Contracting Officer, (2) dampen and mix/blend the loosened material to an acceptable moisture content, and (3) compact this layer in accordance with the applicable requirement of paragraph 9, COMPACTION.

8.2 Transition Fill: Moisture control will be necessary on transition material to facilitate compaction and control dust. Flooding, jetting and sluicing will not be permitted. Placement moisture content shall be between optimum moisture content minus 2% and optimum moisture content plus 1%.

8.3 Drainage Fill: As it is being placed and compacted, moisture control will be necessary on drainage fill material to facilitate compaction and control dust. Flooding, jetting or sluicing will not be permitted. Moisture application shall be a maximum 2 gallons/ square yard/lift.

9. **COMPACTION:**

9.1 Equipment: During the summer of 1988, the Government conducted a Test Fill program at the dam site. Information obtained during that work was used to develop the compaction and equipment requirements for the embankment. The Contractor is invited to review the results of the Test Fill-field and laboratory testing. The Test Fill field and laboratory test datum are the results of tests performed on materials selectively borrowed and specially processed for use in the test fill program. These test results may not be totally representative of the materials encountered insitu. Refer to the logs of exploration presented in the drawings. The Contractor may request a substitute for the approved compaction equipment. Approval of substitute equipment will be based on the results of a Test Fill program designed and evaluated by the Contracting Officer and paid for by the Contractor at no additional cost to the Government. Unless otherwise approved the compaction equipment shall conform to the following requirements and shall be used as prescribed in subsequent paragraphs and Compaction Summary, TABLE II. All compaction equipment must be approved by the Contracting Officer. Approval will be based on written verification of the equipments characteristics through manufacturers information, scale/weight tickets, testing etc.

Compaction
Summary, Table II

Material	Equipment	Minimum (1) Coverages	Maximum Loose Lift Thickness
Impervious Fill Core (CL,ML)	Tamping Rollers	6	8"
Random Fill-I, D/S Shell			
Coarse Grained (GC,GM,SC,SM, etc.)	Rubber Tired Roller Roller (50T) or	6	12"
	Vibratory Rollers (10T) (10T)	5	12"
Fine Grained (CL,ML)	Tamping Rollers	6	8"
Random Fill II U/S Shell	Vibratory Rollers (10T)	5	12"
Random Fill III U/S Shell	Vibratory Rollers (10T)	5	12"
Transition Fill I	Vibratory Rollers (10T)	2	12"
Transition Fill II	Vibratory Rollers (10T)	4	12"
Drainage Fill I	Static Smooth Drum (10T)	2	12"
Drainage Fill II	Static Smooth Drum (10T)	2	12"
Backfills	As Approved	(2) As Required	4"

(1) Compact all materials at or near the optimum moisture content. Acceptable moisture limits are shown on Table 1, paragraph 7.9.1.

(2) As required to obtain minimum 95% compaction (ASTM D 698) or minimum 85% relative density (ASTM D 4253).

9.1.1 Tamping Rollers:

9.1.1.1 Towed: Tamping rollers shall be used to compact Impervious Fill, fine grained Random Fill I, and other fine grained (CL, ML, CH) materials. Tamping rollers shall consist of two or more non-vibratory roller drums mounted side-by-side in a suitable frame and towed by a crawler-type tractor having sufficient power to pull the roller satisfactorily when the drums are fully ballasted. Each drum shall be free to pivot about an axis parallel to the direction of travel. Rollers operated in tandem sets shall be controlled in a manner such that the prints produced by the tamping feet of the tandem units are staggered. Each drum of a roller shall have an outside diameter of not less than 5 feet and shall be not less than 5 feet in length. The space between two adjacent drums, when on a level surface, shall not be less than 12 inches nor more than 15 inches. Each drum ballasted with fluid shall be equipped with at least one

pressure-relief value and with at least one safety head. The safety head shall be equal to union-type safety heads equipped with rupture discs suitable for rupturing pressures between 50 and 75 psi as manufactured by the Fike Metal Products Corporation, Blue Springs, Missouri. The pressure relief valve is a manually operated valve and shall be opened periodically. Personnel responsible for opening pressure-relief valves shall be periodically instructed to ascertain that valve openings are free from plugging to assure that any pressure developed in roller drums is released at each inspection. At least one tamping foot shall be provided for each 100 square inches of drum surface. The length of each tamping foot from the outside surface of the drum shall not be more than 10 inches and shall be maintained at not less than 7 inches. The distance between the centers of any two adjacent tamping feet shall not be less than 9 inches. The bearing surface of each tamping foot shall be flat with a surface area not less than 5 square inches nor more than 10 square inches. During the operation of rolling, the spaces between the tamping feet shall be maintained clear of materials which would impair the effectiveness of the tamping rollers. The weight of a roller when fully loaded shall be not less than 3,500 pounds per foot of drum length and the roller empty shall be not more than 2,500 pounds per foot of drum length. The bearing surface, tamping foot size, the drum loading, and the operation of the rollers shall be as required to obtain the desired compaction. If more than one roller is used on any one layer of fill, all rollers so used shall be of the same type and essentially of the same dimensions. Rollers shall be drawn by crawler-type tractors at a speed not to exceed 5.0 mph. Under normal operation the drums shall be fully ballasted (3,500 lbs/linear ft.) and this ballasted weight shall be verifiable by weight tickets or other means approved by the Contracting Officer.

9.1.1.2 <u>Self-propelled</u>: The use of self-propelled non-vibratory tamping rollers conforming with the following specification will be permitted, and their design and operation shall be subject to the approval of the Contracting Officer, who shall have the right at any time during the prosecution of the work, to direct such modifications to the tamping feet or variations in roller drum weight where applicable, as may be found necessary to secure optimum compaction of the earthfill materials. If use of self-propelled tamping rollers causes shearing of the fill, laminations in the fill, or results in inadequate compaction, the Contracting Officer may direct that such rollers be removed from the fill and that appropriate towed tamping rollers be used.

9.1.1.2.1 <u>Multi-Drum Units</u>: Two-or three-drum side-by-side units that are either in drive position or propelled by separate power equipment shall have a clearance between adjacent drums not less than 12 inches nor more than 15 inches. Two-drum or four-drum equipment separated by cab and differential and

arranged in tandem must have its static weight equally distributed to all compaction drums and must have the tandem drums positioned such that the prints of the tamping feet produced by the tandem drums are staggered. The surface on which the tamping feet are mounted shall have a minimum outside diameter of four feet and at least one tamping foot for each 100 square inches of drum surface. The distance between the centers of any two adjacent tamping feet shall be not less than 9 inches. The length of each tamping foot from the outside mounting surface of the drum shall be not more than 10 inches and shall be maintained at not less than 7 inches. The bearing surface of each tamping foot shall be flat and have a surface area not less than 5 square inches nor more than 10 square inches. Cupped recesses within the bearing surface of each tamping foot will be permitted but shall not exceed 0.5 inches in depth. During rolling operations, the spaces between the tamping feet shall be maintained clear of materials which would impair the effectiveness of the tamping roller. The weight of all roller drums during compaction of fill materials shall be maintained uniform with the weight per foot of drum length not less than 3,500 pounds.

9.1.1.2.2 <u>Single-Drum Units</u>: Self propelled single drum units shall have a minimum static weight at the drum of 20,000 lbs. The minimum drum diameter shall be 5 ft and the minimum drum length shall be 6 ft. There shall be at least one tamping foot or pad for approximately each 100 square inches of the drum surface area. The distance between the centers of any two adjacent tamping feet shall be not less than 9 inches. The length/height of each tamping foot/pad from the outside mounting surface shall not be less than 4 inches. The bearing surface of each tamping foot/pad shall be flat or slightly pointed and have a surface area between 20 and 36 square inches. During rolling the spaces between the tamping feet/pads shall be maintained clear of all material impairing the effectiveness of the tamping roller.

9.1.1.3 <u>General</u>: For self-propelled rollers with drums capable of being ballasted with fluid, each drum shall be equipped with at least one pressure-relief valve and with at least one safety head. The safety head shall be equal to union type safety heads equipped with rupture discs suitable for rupturing pressures between 50 and 75 psi as manufactured by the Fike Metal Products Corporation, Blue Springs, Missouri. The pressure relief valve is a manually operated valve and shall be opened periodically. Personnel responsible for opening pressure-relief valves shall be periodically instructed to ascertain that valve openings are free from plugging to assure that any pressure developed in roller drums is released at each inspection. For self-propelled rollers in which steering is accomplished through the use of rubber-tired wheels, the tire pressure shall not exceed 40 psi. The use of the compactor shall be discontinued if

the tires leave ruts that prevent uniform compacting by the tamping roller and the substitution of appropriate towed tamping rollers may be directed by the Contracting Officer. When a self-propelled roller is provided with a dozer blade, coverages made with the blade in operation shall not be counted as compaction coverages. Self-propelled rollers shall be operated at a speed not to exceed 5.0 mph. The ballasted weight of the compaction equipment shall be verified by weight-tickets or other means acceptable to the Contracting Officer.

9.1.2 Vibratory Rollers: Vibratory rollers for compacting Random Fill II and III, coarse grained Random Fill I and Transition Fill layers shall be equipped with a smooth steel compaction drum and shall be operated at a frequency of vibration during compaction operation between 1100 and 1500 vpm. Pad-foot drum rollers conforming to these requirements may also be used to compact Random Fill II or III and coarse grained Random Fill I. Vibratory rollers may be either towed or self-propelled and shall have an unsprung drum weight that is a minimum of 60 percent of the rollers' static weight. Towed rollers shall have at least 90 percent of their weight transmitted to the ground through the compaction drum when the roller is standing in a level position hitched to the towing vehicle. Vibratory rollers for compacting coarse grained Random Fill I, Random Fill II and III and Transition Fill I and II materials shall have a minimum static weight at the drum of 20,000 pounds and a minimum dynamic force of 40,000 pounds when operating at approximately 1,300 VPM for a total applied force of not less than 10,000 pounds per foot of compaction drum length during compaction. The minimum drum diameter shall be 5 ft and the minimum drum length shall be 6 ft. The level of amplitude and vibration frequency during compaction will be maintained uniform throughout the embankment zone within which it is operating. Rollers shall be operated at speeds not to exceed 1.5 miles per hour. The Contractor shall furnish sufficient data, drawings, and computations for verification of the above specifications, and the character and efficiency of this equipment shall be subject to the approval of the Contracting Officer. VPM shall be verified periodically by methods independent of the equipment gauges. All gauges shall be calibrated every 6 months.

9.1.3 Smooth Drum Static Rollers: Smooth drum rollers meeting the requirements for Vibratory Rollers in Paragraph 9.1.2 shall be used to compact Drainage Fill I & II material except that the rollers shall be operated in the static mode (i.e. vibrator-off).

9.1.4 Rubber-Tire Rollers: Rubber-tired rollers shall have a minimum of four wheels equipped with pneumatic tires. The tires shall be of such size and ply as can be maintained at tire pressures between 90 and 100 pounds per square inch for a 25,000 pound wheel load during rolling operations. The roller wheels

shall be located abreast and be so designed that each wheel will act independently and carry approximately equal load in traversing uneven ground. The spacing of the wheels will be such that the distance between the nearest edges of adjacent tires will not be greater than 50 percent of the tire width of a single tire at the operating pressure for a 25,000 pound wheel load. The roller shall be provided with a body suitable for ballast loading such that the load per shell may be varied, as directed by the Contracting Officer, from 18,000 to 25,000 pounds. The normal operating weight of the roller shall be 100,000 lbs and the weight shall be verifiable by weight-ticket or other approved sources. The roller shall be towed at speeds not to exceed 5 miles per hour. The character and efficiency of this equipment shall be subject to the approval of the Contracting Officer.

9.1.5 Grid Type Self Propelled Rollers: The Contracting Officer may approve the use of grid-type self propelled roller provided the performance of this equipment meets or exceeds the performance of the specified equipment. The grid roller performance will be based on a full scale test fill designed and evaluated by the Contracting Officer.

9.1.6 Power Tampers: Compaction of material, in areas where it is impracticable to use a roller, front end loader or other equipment as provided in paragraph 7.1, shall be performed using approved power tampers.

9.1.7 Discs: The specified discs shall have a minimum of two gangs hooked in tandem and shall be adjustable to penetrate a minimum fill lift of 8 or 12 inches respectively. The width of cut shall not be less than 12 feet. Disc blades shall be notched, spaced a minimum of 16-5/16 inches and have a minimum diameter of 36 inches. Worn blades having a diameter less than 36 inches shall be immediately replaced. The disc shall be equipped with self cleaning scrapers to prevent accumulation of mud and debris between and on the disc blades. Towed speed shall not exceed 5 MPH and the angle of cut shall be adjustable while the tool is in operation.

9.1.8 Motor Graders: Embankment fill will be spread to the required lift thickness with a rubber tired motor grader. The adjustable blade shall be a minimum of 14 feet long and the grader shall develop a minimum of 180 (flywheel) horsepower or weigh a minimum of 38,500 lbs. A larger motor grader may be used to optimize spreading operations.

9.1.9 Water Trucks: Water trucks must be equipped with a pressurized distribution system and multiple spray nozzles such that a uniform distribution (fine spray) of water is delivered to the fill surface/materials requiring additional moisture. Application of water solely by gravity feed will not be permitted.

9.2 Impervious and Random Fill: After a layer of Impervious or Random Fill material has been dumped and spread, it shall be disced to break up and blend the fill materials. Discing shall be performed with the specified heavy disc, or other approved equipment, to the full depth of the lift. If two coverages of the disc does not accomplish the breaking up and blending of the materials, additional coverages of the disc will be required, but in no case will more than four coverages of the disc on any one layer be required for this purpose. However, when the moisture content is out-of-spec or the moisture distribution non-uniform, additional discing shall be used to moisture condition the material. When the moisture content and the condition of the layer is satisfactory, the lift shall be compacted by not less than the minimum specified complete coverages of the required roller. The use of towed tandem roller drums that are in true alignment shall not be permitted. A complete coverage shall consist of the coverage of the entire lift to be compacted with the roller specified. A coverage consists of a single application of the required compactive/discing effort at a given spot. In most instances a pass is equivalent to a coverage. However, if units meeting the required equipment requirement are configured in echelon a single pass may result in multiple coverages. Portions of the fill which are not accessible to the roller shall be placed in maximum 4-inch loose layers and compacted with power tampers to a degree equal to that obtained on the other portions of the compacted fill by rolling as specified, but in no case shall the degree of compaction be less than 95% of the standard compaction maximum dry density for that material. Dumping, spreading, moisture conditioning, and compacting may be performed at the same time at different points along the fill surface when there is sufficient area to permit these operations to proceed simultaneously. When, in the prosecution of the work, excavation precedes fill to such an extent that the materials excavated cannot be placed directly in the embankment, such materials shall be stockpiled at approved locations adjacent to the work until their use is required. No additional payment will be made for such stockpiling nor for the reloading and hauling of this material to its final position.

9.3 Transition and Drainage Fill: After each layer of Transition and Drainage Fill has been dumped and spread, the entire surface of the layer shall be compacted by complete coverages of the specified roller. Transition Fill II shall be compacted with a minimum 4 complete coverages. Drainage Fill I and II and Transition Fill I shall be compacted with a minimum 2 complete coverages. A complete coverage shall be as specified in paragraph: 9.2 IMPERVIOUS AND RANDOM FILL. If there is particle breakdown as a result of compaction, the gradation before compaction shall be adjusted so the gradation after compaction conforms with the required gradation.

9.4 Additional rolling for Compaction: If, in the opinion of the Contracting Officer, the desired compaction of any portion of the embankment is not achieved by the minimum number of coverages specified, additional complete coverages shall be made over the surface area of such designated portion until the desired compaction has been obtained. Additional rolling will be paid for at the contract unit price for Bid Item, Embankment Additional Rolling for Compaction.

10. WASTE FILL:

Waste material from required excavations and from the designated borrow areas shall be placed as indicated on the drawings or as otherwise required. The fill shall be dumped and spread in horizontal layers not to exceed 18 inches in thickness. Compaction other than that obtained by the controlled and staggered movement of the hauling and spreading equipment over the area will not be required. Refer also to paragraph DISPOSAL OF EXCAVATED MATERIAL section STRIPPING AND EXCAVATION.

11. BACKFILL:

11.1 General: Backfill is defined as satisfactory excavation refill or embankment fill which (1) is within 4 feet in any direction of structures (including instrumentation), (2) cannot be placed around or adjacent to a structure until the structure is completed, (3) is a zoned type of material or (4) materials placed in trenches and other restricted areas, such as excavations for record samples, that cannot be compacted by the normal specified procedure for embankment fill.

11.2 Placement: To facilitate compaction the maximum particle size of all backfill materials shall be restricted to 3 inches. Backfill shall be placed in maximum 4 inches loose lifts, moisture conditioned to approximately the optimum moisture content and compacted to a minimum 95% compaction. Percent compaction shall be based on the Standard Compaction Test, EM 1110-2-1906 Appendix VI or VIA and ASTM D 698. Cohesionless materials such as the Drainage Fill I and II shall be compacted with compactors as required or as directed by the Contracting Officer to a minimum 85% relative density per ASTM D 4253.

12 SLIDES:

In the event of slides in any part of the embankment prior to final acceptance of the work the Contractor shall remove material from the slide area, as directed, and shall rebuild such portion of the embankment. In case it is determined that the slide was caused through the fault of the Contractor the removal and disposal of material and the rebuilding of the embankment shall be performed without cost to the Government; otherwise this work will be paid for at the applicable contract unit prices for those materials excavated and for fill or backfill.

13. **MEASUREMENT AND PAYMENT:**

13.1 Measurement: Embankment will be measured, compacted in place. The unit of measurement will be the cubic yard, computed by the average end area method from the cross sections.

13.1.1 Embankment will be measured as the volume between the foundation lines as determined on the basis of a detailed quantity survey made after excavation including the core trench and accomplishment of foundation preparation except scarifying, and the lines, grades and slopes of the accepted embankment fills. Measurement shall not include slope protection, bedding, topsoil, overbuild, or road section.

13.1.2 Measurement of each type of material will be the volume between the above described limit lines and the payment lines indicated on the cross sections, shown on the drawings, or as otherwise established by the Contracting Officer. Surveys shall consist of cross sections on stations at maximum 50 feet intervals. Additional rolling for compaction will be measured for payment on the basis of the number of roller hours the compaction equipment is operated in accomplishing the compaction. Daily records of additional hours shall be maintained. Concrete used in filling spaces beneath rock overhangs and around protrusions will be measured for payment as specified in paragraph 6.3 Rock.

13.2 Payment: Payment for the various types of fill in the embankment will be made as specified in the following paragraphs regardless of the source of the placed material. Contractor Quality Control is a subsidiary obligation of the Contractor associated with embankment construction. Payment for CQC shall be included in the associated embankment contract unit prices.

13.2.1 Impervious Fill: Impervious fill, measured as specified, shall be paid for at the contract unit price per cubic yard for Item, Embankment, Impervious Fill (Core), Complete In Place Dam. Such payment shall constitute full compensation for all work and costs in connection with the spreading, discing, moisture conditioning, removal of objectionable material, compacting, and all other incidental work required for the construction, protection, and maintenance of the embankment as specified.

13.2.2 Random Fill I, II, III: Random Fill I, II, III for the main dam embankment, the small fills at the upstream and downstream toes and the sloping backfill above the embankment on the left abutment, measured as specified, shall be paid for at the applicable contract unit price per cubic yard for Item Embankment-Downstream Shell Random Fill I Complete in Place Dam or Item Embankment-Upstream Shell Random Fill II (Random Fill III Optional) Complete In Place Dam which price shall include all

work and costs for preparation of foundation (i.e. scarification, rolling, etc.) and the spreading, moisture conditioning, discing, blending, compacting, and all other operations incidental to the placement of random fill. If the Contractor chooses to use Random III material no additional payment will be made for excavation, processing or transporting the material to the dam site.

13.2.3 Transition Fill I, II: Transition Fill I and II, measured as specified, shall be paid for at the applicable contract unit price per cubic yard for Item Embankment-Transition Fill I Complete In Place Dam and Item Embankment-Transition Fill II Complete In Place Dam which price shall constitute full compensation for all work and costs necessary in procuring, loading, and hauling the materials and providing, processing or obtaining the required gradation. It shall also include all work associated with preparation of foundation (i.e. scarification, rolling, etc.), placing, moisture conditioning, compacting and removing objectionable material and all other incidental work required for the construction, protection and maintenance of the transition fill.

13.2.4 Drainage Fill I, II: Drainage Fill I and II, measured as specified, shall be paid for at the applicable contract unit price per cubic yard for Item, Embankment, Drainage Fill I, (Horizontal Drain) Complete In Place Dam and Item Embankment, Drainage Fill II, (Inclined Drain) Complete In Place Dam. Such payment shall include full compensation for all work and costs necessary in procuring, loading, and hauling the materials and providing, processing or obtaining the required gradation. It shall also include all work in connection with the placing, spreading, moisture conditioning, compacting, removal of objectionable material, and all other incidental work required for the construction, protection and maintenance of the drainage fill.

13.2.5 Waste Fill: No separate payment will be made for waste fill and all costs incidental to hauling, spreading, protecting, and maintenance of such fill shall be included in the contract price for excavation of the material.

13.2.6 Additional rolling for compaction: Additional rolling for compaction will be paid for at the contract price per roller hour for Item, Embankment Additional Rolling for Compaction.

13.2.7 Backfill: No additional payment will be made for backfill. All costs for which shall be considered as a subsidiary obligation of the Contractor associated with construction of the embankment.

13.2.8 Water for compaction and dust control: No separate payment will be made for water. All cost in connection therewith shall be considered a subsidiary obligation of the Contractor.

13.2.9 Concrete for Foundation Preparation: Concrete used in foundation and abutment preparation and measured in accordance with SECTION 02219 FOUNDATION PREPARATION, CORE TRENCH will be paid for at the established contract price per cubic yard for "Dental and Foundation Shaping Concrete". Such payment shall constitute full compensation for all labor, materials, tools and equipment required to complete the work.

13.2.10 Topsoil: Topsoil placed and spread to the required thickness on the left abutment and downstream face of the dam, measured as specified, shall be paid for at the applicable contract unit price per cubic yard for Item Embankment-Topsoil D/S Slope Complete In Place Dam. The price shall include all costs for processing, hauling, placing, and spreading. No payment will be made for excess thickness of topsoil nor for material required to replace topsoil lost by erosion or otherwise.

13.2.11 Seeding: Seeding the left abutment and downstream face of the dam will be performed in general accordance with Section: DUST AND EROSION CONTROL SEEDING. Payment for seeding shall be included in the lump sum price for Item Seeding, which price shall include all plant, labor and materials required to complete the work.

13.2.12 Contractor Quality Control (CQC): CQC is a subsidiary obligation of the Contractor, the cost of which shall be included in the applicable unit bid price.

14. CONTRACTOR QUALITY CONTROL:

Contractor Quality Control is that part of the system by which the Contractor regulates, tests, and inspects his procedures, equipment, materials and personnel so that the completed product complies with the requirements of the contract documents.

14.1 Responsibility, Compilation, and Submittal of Test Results: The Contractor shall be responsible for full compliance with these instructions in the performance of tests and the preparation, submittal, and maintenance of tests included herein and listed in the contract specifications. Copies of each test result shall be prepared with all necessary data recorded, documentation and computations completed. Distribution shall be as follows:

4 copies total:

3 copies to Contracting Officer, Corps of Engineers
1 copy to Geotechnical Engineer (through Resident Contracting Officer), Corps of Engineers

Distribution of the final copies to the Resident Contracting Officer shall be made within 24 hours after sampling or initiating test except when the test duration requirements exceed 24 hours. In the latter case, distribution shall be within 24 hours after completion of the test. Each test shall be started and completed without delay, and payment for materials placed, as well as for any subsequent construction dependent upon these materials, will not be authorized until final test reports have been properly distributed. All test/sample locations shall be determined to the nearest foot. The location of all tests/ samples shall be determined with respect to State Coordinates (Northing, Easting), Station, offset (U/S or D/S) and elevation (ft. msl). The sample/tests shall have a sequential numbering system as approved by the Contracting Officer. All test forms shall be accurately completed, and a test location plan shall be submitted when directed by the Contracting Officer. All test forms not accurately completed will be immediately returned to the Contractor for correction or completion, and no Quality Control tests will be accepted unless signed by the Laboratory Manager and Supervising Technician. A Materials Test Log (summarizing QC testing) shall be maintained at the Contractor's project office and made available upon request by the Contracting Officer. In addition, a copy of the Materials Test Log shall be submitted with the monthly progress report for determining the contractor's progress payment for materials placement represented by these tests.

14.2 <u>Contractor's Quality Control (QC)</u>: The QC program is based, in part, on specific tests required for several items of work involved. The location and frequency of test required depend on the manner in which the work is being performed and the uniformity and quality of the tests obtained. A minimum testing program for quality control testing is outlined below. Additional testing may be required when the minimum testing program is not considered to be adequate or applicable. Tests indicating noncompliance with the contract documents shall be reported immediately to the Contracting Officer or the Contracting Officer's representative and the Contractor's Quality Control representative will recommend steps to be taken to alleviate areas of noncompliant conditions. The Contracting Officer or his representative reserves the right to designate the location of sampling and type of test to be performed at the Contractor's expense to verify compliance. References to standard test methods and testing procedures for sampling and testing of the material are given in Paragraph 2 APPLICABLE PUBLICATIONS, unless otherwise specified, and additional types of tests may be required by other areas of the contract documents. Periodic Quality Assurance tests shall be made by the Contracting

Officer's representative to assure the Contractor's compliance with contract requirements and specifications.

14.3 Laboratory Facilities: The Contractor shall use only an independent established commercial laboratory or laboratories approved by the Contracting Officer. Laboratory facilities and personnel are to be in accordance with ASTM D 3740 (soils), ASTM C 1077 (concrete), and ASTM D 3666 (asphalt) as applicable. The Government reserves the right to make inspections of the contractor's designated laboratory facilities, including test equipment and procedures. This is to ensure that all equipment is in proper working order, as well as correctly calibrated, and that specified test procedures are being performed by qualified personnel. The Government also reserves the right to conduct additional QA testing, using either its own equipment and facilities or the Contractor's. This additional QA testing shall be performed as the Contracting Officer deems necessary, to assure the Contractor's compliance with the contract documents.

14.4 Test Requirements:

14.4.1 Equipment: Before starting work, all equipment specifications shall be verified in writing to the Contracting Officer. In addition, compaction equipment operating weights shall be confirmed by weighbill or other means acceptable to the Contracting Officer. Equipment shall be maintained in satisfactory working order at all times. At least once a week and whenever requested by the Contracting Officer the equipment shall be inspected to determine if it is still operating within the specified requirements. The results of such inspections and any corrective actions shall be reported in Contractors daily report.

14.4.2 Materials: Embankment fills shall be tested to determine grain size distribution (EM 1110-2-1906 Appendix V/ASTM C117 and C136), Liquid and Plastic Limit (ASTM D 4318) and resistance to abrasion (ASTM C131) according to the following schedule: Representative samples shall be obtained for testing.

	Tests			
Material	GS	LL & PL	LAA	Minimum Frequency
Impervious Fill	Yes	Yes	No	1/5,000 cy
Random Fill I	Yes	Yes	No	1/5,000 cy
Random Fill II	Yes	Yes	No	1/5,000 cy
Random Fill III	Yes	No	No	1/5,000 cy
Transition Fill I	Yes	No	Yes	1/2,500 cy
Transition Fill II	Yes	No	Yes	1/2,500 cy
Drainage Fill I	Yes	No	Yes	1/2,500 cy
Drainage Fill II	Yes	No	Yes	1/2,500 cy

GS - Grain Size LL - Liquid Limit
PL - Plastic Limit LAA - Los Angeles Abrasion Test

14.4.3 Lift Thickness: Lift thickness shall be continuously checked. Person(s) shall be designated grade checkers. Grade checkers shall be on the fill actively controlling placement of materials at all times. Refer also to paragraphs 7, 8, and 9.

14.4.4 Compactive Content: Compactive effort (i.e., Roller passes) as well as the discing operating (i.e., passes), shall be continuously monitored, recorded and reported in writing daily. Person(s) other than the equipment operators shall have the responsibility of ensuring the specified compactive effort is applied, and these persons shall be on the fill directing the discing and compactive effort at all times. Refer also to paragraphs 7, 8, and 9.

14.4.5 Moisture Content: Moisture content (EM-1110-2-1906 Appendix I/ASTM D 2216) determinations with companion grain size distribution test shall be performed according to the following schedule. Representative samples shall be obtained for testing. Refer also to paragraph 7, 8, and 9.

Material	MC(1)	GS	Minimum Frequency (2)
Impervious Fill	Yes	Yes	2/8 hour shift during placement
Random I	Yes	Yes	2/8 hour shift during placement
Random II	Yes	Yes	2/8 hour shift during placement
Random III	Yes	Yes	2/8 hour shift during placement
Transition Fill I	Yes	No	1/8 hour shift during placement
Transition Fill II	Yes	No	1/8 hour shift during placement

MC - Moisture Content   GS - Grain Size Distribution

(1) Moisture content tests shall be oven dried performed on the entire sample obtained. Scalping of rock prior to testing will not be permitted. As part of the moisture content test the grain size distribution of the oven dried sample shall also be determined using the following sieve sizes 3", 3/4", No. 4 and No. 200.

(2) Except for transition fill I and II which requires 1/8 hour shift or portion thereof, the minimum frequency of 2/8 hour shift also applies to any portion of a shift less than 8 hours. The two tests shall be equally "distributed" in the shift based on the volume of material being placed.

15. GOVERNMENT ACCEPTANCE TESTING:

15.1 The Government shall perform acceptance testing on embankment materials after compaction. Testing will generally include but will not be limited to lift thickness checks, in

place density, moisture content, grain size distribution, plastic and liquid limits test, laboratory compaction tests and record sampling. Acceptance testing does not include Contractor Quality Control testing nor Government Quality Assurance testing. Government Acceptance Testing shall be used to determine compliance with the specifications. Testing shall be coordinated to minimize interference with the construction progress, but if required the Contractor shall modify his work to accommodate the Acceptance Testing. The Contractor shall be required to supply selected equipment and labor for excavating, and for backfilling the test locations. Record samples consist of large diameter undisturbed samples excavated from the embankment. Excavation and backfill for each record sample location may be on the order of 15 cubic yards.

15.2 Frequency of Testing: The frequency of testing shall generally be as follows.

Material	Test Frequency (Complete Series)	Test Frequency (Record Samples)
Impervious Fill	1/2,500 cy	1/100,000 cy
Random Fill I	1/2,500 cy	1/100,000 cy
Random Fill II	1/2,500 cy	1/100,000 cy
Random Fill III	1/2,500 cy	1/100,000 cy
Transition Fill I	1/2,500 cy	None
Transition Fill I	1/2,500 cy	None
Drainage Fill I	1/2,500 cy	None
Drainage Fill II	1/2,500 cy	None

16. **CONSTRUCTION QUALITY CONTROL:** Attention is directed to SECTION: CONSTRUCTION QUALITY CONTROL which requires the Contractor to perform quality control inspection, testing and reporting.

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- REMINDER -

Located at the front of these specifications are the Contract Clauses, Special Clauses and Division I GENERAL REQUIREMENTS of the Technical Specifications, which apply to every aspect of this contract including the work in this section whether performed by Prime Contractor, subcontractor, or supplier.

APPENDIX II

FIELD CONTROL DATA, LITTLE DELL DAM

APPENDIX II

FIELD CONTROL DATA, LITTLE DELL DAM

RANDOM I
DOWNSTREAM SHELL

Specifications Comparison Report

Gradations Report

Compaction Report

Comments Report

Percent Compaction vs Moisture Content with respect to the Optimum Moisture Content

Field Dry Density vs Percent Compaction

Percent Compaction vs Elevation

and

Percent Moisture Content with respect to the Optimum Moisture Content vs Elevation

Gradation Curves

Plasticity Chart

S Curves

- % Cobbles
- % Gravel
- % Sand
- % Fines
- % Compaction
- Unit Weight
- Moisture Content vs Optimum Moisture Content
- Moisture Content
- Maximum Dry Density (Laboratory)
- Optimum Moisture Content (Laboratory)

Sand Cone/In Place Dry Unit Weight vs Moisture Content

Laboratory Maximum Dry Unit Weight vs Optimum Moisture Content

Test Locals

PROJECT: LITTLE DELL LAKE, DAM AND APPURTENANCES RIVER: SALT LAKE CITY STREAMS STATE: UTAH TOWN: SALT LAKE CITY	CONTRACT NO. DACW05-89-C-0045 CONTRACTOR: CLEMENT BROTHERS AND J.E. STARNES CO.	DATE OF REPORT: 12-07-92 01-01-90 THRU 12-31-92

EMBANKMENT ZONE	MIN. DESIGNED % COMP	SPEC. W.C. % RANGE	LOOSE LIFT THICK. (IN)	NUMBER OF PASSES	COMPACTION EQUIPMENT
RANDOM I	95	-3 TO 1	8	6	CAT 825C, SP-60

TEST NUMBER	DATE	ELEV	LOCATION STATION	LOCATION OFFSET	% COBBL	% GRAV	% SAND	% FINES	% COMPACTION DESIGN >= 95%	MOISTURE IN SPEC -3 %- 1 %	GRADATION IN SPEC	GRAVELS IN SPEC > %	FINES IN SPEC < %	TEST IN SPEC	STATUS FAILED TESTS
581	10-28-90	5585.0	1520	-100	3.0	6.0	20.0	71.0	Y	Y	Y	-	-	Y	
781	06-18-91	5584.6	1500	-200	0.0	7.0	35.0	58.0	N	N	Y	-	-	N	OLD,M
786	06-19-91	5583.6	1585	-315	3.0	10.0	26.0	61.0	Y	Y	Y	-	-	Y	
790	06-20-91	5581.9	1550	-305	0.0	7.0	23.0	70.0	Y	N	Y	-	-	N	OLM
793	06-21-91	5587.6	1600	-250	0.0	8.0	34.0	58.0	Y	Y	Y	-	-	Y	
796	06-21-91	5589.2	1550	-200	0.0	3.0	22.0	75.0	Y	N	Y	-	-	N	OLM
802	06-24-91	5588.2	1465	-250	3.0	10.0	17.0	70.0	Y	Y	Y	-	-	Y	
804	06-24-91	5589.6	1625	-325	0.0	6.0	25.8	68.2	N	Y	Y	-	-	N	OLD
808	06-25-91	5590.7	1550	-250	5.0	11.0	21.0	63.0	Y	N	Y	-	-	N	OLM
811	06-25-91	5574.3	1500	-505	0.0	12.0	19.0	69.0	Y	Y	Y	-	-	Y	
812	06-26-91	5576.8	1500	-500	0.0	6.0	21.0	73.0	Y	Y	Y	-	-	Y	
823	06-27-91	5583.4	1450	-375	0.0	7.0	23.0	70.0	Y	Y	Y	-	-	Y	
829	06-28-91	5580.2	1525	-550	1.0	9.0	24.0	66.0	Y	N	Y	-	-	N	OLM
833	06-29-91	5572.8	1400	-625	0.0	2.0	23.0	75.0	Y	N	Y	-	-	N	OLM
834	06-28-91	5571.6	1475	-642	7.0	11.0	15.0	67.0	N	Y	Y	-	-	N	OLD
843	06-29-91	5587.3	1650	-200	0.0	14.0	26.0	60.0	Y	Y	Y	-	-	Y	
848	07-01-91	5584.1	1500	-550	0.0	11.0	16.0	73.0	Y	Y	Y	-	-	Y	
850	07-01-91	5589.9	1550	-350	1.0	10.0	22.0	67.0	Y	Y	Y	-	-	Y	
853	07-02-91	5586.6	1350	-400	1.0	4.0	26.0	69.0	Y	N	Y	-	-	N	OLM
859	07-02-91	5588.9	1500	-450	0.0	10.0	26.0	64.0	Y	Y	Y	-	-	Y	
860	07-03-91	5590.0	1500	-500	6.0	9.0	20.0	65.0	Y	Y	Y	-	-	Y	
861	07-03-91	5593.6	1730	-400	0.0	6.0	22.0	72.0	Y	Y	Y	-	-	Y	
862	07-03-91	5593.1	1600	-250	0.0	5.0	22.0	73.0	Y	Y	Y	-	-	Y	
863	07-04-91	5593.1	1400	-150	1.0	5.0	25.0	69.0	Y	Y	Y	-	-	Y	
864	07-04-91	5589.9	1400	-400	0.0	6.0	25.0	69.0	Y	Y	Y	-	-	Y	
865	07-05-91	5589.7	1400	-375	0.0	7.0	25.0	68.0	Y	Y	Y	-	-	Y	
868	07-05-91	5594.6	1575	-250	0.0	8.0	21.0	71.0	Y	Y	Y	-	-	Y	
875	07-09-91	5590.4	1425	-475	0.0	8.0	16.0	76.0	Y	N	Y	-	-	N	OLM
876	07-09-91	5595.3	1550	-350	2.0	22.0	26.0	50.0	N	N	Y	-	-	N	RW
882	07-15-91	5595.3	1475	-275	0.0	5.0	25.0	70.0	Y	Y	Y	-	-	Y	
892	07-10-91	5574.7	1400	-725	0.0	4.0	23.0	73.0	Y	Y	Y	-	-	Y	
894	07-10-91	5585.0	1517	-550	0.0	5.0	21.0	74.0	Y	Y	Y	-	-	Y	
897	07-12-91	5577.8	1475	-750	0.0	2.6	12.4	85.0	N	Y	Y	-	-	N	OLD
900	07-12-91	5588.0	1450	-700	0.0	2.0	10.2	87.8	Y	Y	Y	-	-	Y	
901	07-13-91	5582.6	1450	-720	0.0	3.0	13.2	83.8	Y	Y	Y	-	-	Y	
903	07-15-91	5595.0	1475	-400	2.0	26.0	27.0	45.0	Y	Y	Y	-	-	Y	
910	07-16-91	5593.7	1400	-550	0.0	5.0	13.3	81.7	Y	Y	Y	-	-	Y	
912	07-15-91	5598.5	1600	-375	0.0	1.5	28.9	69.6	Y	Y	Y	-	-	Y	
915	07-17-91	5591.4	1375	-650	0.0	1.0	7.9	91.1	Y	Y	Y	-	-	Y	
929	07-17-91	5598.7	1550	-520	1.0	8.0	22.7	68.3	Y	Y	Y	-	-	Y	
930	07-18-91	5600.0	1450	-400	0.0	9.0	15.1	75.9	Y	N	Y	-	-	N	OLM
934	07-18-91	5597.3	1490	-105	2.0	9.0	23.0	66.0	Y	Y	Y	-	-	Y	
938	07-22-91	5604.4	1625	-450.	0.0	11.0	19.0	70.0	Y	Y	Y	-	-	Y	

TEST NUMBER	DATE	ELEV	LOCATION		% COBBL	% GRAV	% SAND	% FINES	% COMPACTION DESIGN >= 95%	MOISTURE IN SPEC -3 %- 1 %	GRADATION IN SPEC	GRAVELS IN SPEC > %	FINES IN SPEC < %	TEST IN SPEC	STATUS FAILED TESTS
			STATION	OFFSET											
939	07-23-91	5600.5	1525	-140	0.0	15.0	22.4	62.6	Y	Y	Y	-	-	Y	
947	07-23-91	5602.4	1400	-250	0.0	9.0	18.0	73.0	Y	Y	Y	-	-	Y	
950	07-24-91	5600.5	1450	-550	3.0	25.0	24.0	48.0	Y	Y	Y	-	-	Y	
956	07-24-91	5600.8	1440	-480	0.0	13.0	26.0	61.0	Y	Y	Y	-	-	Y	
957	07-25-91	5603.9	1600	-150	0.0	18.0	25.0	57.0	Y	Y	Y	-	-	Y	
963	07-26-91	5603.5	1590	-600	0.0	16.0	22.0	62.0	Y	N	Y	-	-	N	OLM
969	07-26-91	5602.2	1450	-150	0.0	7.0	24.0	69.0	Y	Y	Y	-	-	Y	
981	07-29-91	5609.9	1675	-200	2.0	26.0	18.0	54.0	Y	N	Y	-	-	N	OLM
983	07-30-91	5608.2	1440	-400	0.0	21.0	20.0	59.0	Y	Y	Y	-	-	Y	
992	08-01-91	5610.0	1600	-550	3.0	20.0	20.0	57.0	Y	Y	Y	-	-	Y	
1000	08-01-91	5611.4	1450	-450	4.0	23.0	16.7	56.3	Y	Y	Y	-	-	Y	
1004	08-02-91	5617.1	1700	-400	0.0	7.0	18.0	75.0	Y	Y	Y	-	-	Y	
1011	08-03-91	5611.2	1400	-340	6.0	25.0	26.0	43.0	Y	N	Y	-	-	N	OLM
1015	08-05-91	5618.7	1725	-450	6.0	21.0	14.0	59.0	Y	Y	Y	-	-	Y	
1021	08-06-91	5620.1	1550	-475	5.0	15.0	20.0	60.0	Y	Y	Y	-	-	Y	
1022	08-06-91	5616.2	1700	-250	8.0	33.0	22.0	37.0	Y	Y	Y	-	-	Y	
1031	08-07-91	5615.5	1425	-300	0.0	8.0	22.0	70.0	Y	Y	Y	-	-	Y	
1042	08-08-91	5622.1	1560	-195	1.0	28.0	25.0	46.0	Y	Y	Y	-	-	Y	
1048	08-09-91	5619.7	1450	-150	3.0	40.0	22.0	35.0	N	Y	Y	-	-	N	OLD
1053	08-10-91	5624.6	1650	-325	4.0	26.0	21.0	49.0	Y	Y	Y	-	-	Y	
1057	08-09-91	5624.1	1650	-150	2.0	10.0	27.0	61.0	Y	Y	Y	-	-	Y	
1063	08-10-91	5618.4	1780	-100	5.0	28.0	23.0	44.0	Y	Y	Y	-	-	Y	
1072	08-12-91	5627.0	1700	-500	0.0	11.0	22.0	67.0	Y	N	Y	-	-	N	OLM
1075	08-13-91	5625.2	1500	-245	5.0	21.0	18.0	56.0	Y	Y	Y	-	-	Y	
1079	08-13-91	5624.9	1650	-250	4.0	19.0	23.0	54.0	Y	Y	Y	-	-	Y	
1082	08-17-91	5627.5	1600	-300	0.0	3.0	22.0	75.0	Y	Y	Y	-	-	Y	
1086	08-14-91	5624.4	1845	-86	5.0	5.0	22.0	68.0	Y	Y	Y	-	-	Y	
1089	08-17-91	5625.9	1450	-300	0.0	10.0	23.0	67.0	Y	N	Y	-	-	N	OLM
1097	08-15-91	5628.3	1770	-335	0.0	15.0	20.0	65.0	Y	N	Y	-	-	N	OLM
1107	08-17-91	5624.8	1380	-220	9.0	3.0	20.0	68.0	Y	Y	Y	-	-	Y	
1110	08-19-91	5624.4	1335	-315	0.0	14.0	17.0	69.0	Y	N	Y	-	-	N	OLM
1121	08-20-91	5631.7	1725	-75	6.0	23.0	22.0	49.0	N	Y	Y	-	-	N	OLD
1123	08-20-91	5629.3	1835	-150	1.0	27.0	21.0	51.0	Y	Y	Y	-	-	Y	
1132	08-21-91	5632.9	1700	-100	16.0	19.0	17.0	48.0	Y	N	Y	-	-	N	OLM
1138	08-21-91	5632.9	1750	-400	0.0	10.0	25.0	65.0	Y	Y	Y	-	-	Y	
1142	08-23-91	5634.3	1780	-395	10.0	24.0	19.0	47.0	Y	Y	Y	-	-	Y	
1151	08-23-91	5635.3	1575	-100	0.0	36.0	20.0	44.0	Y	Y	Y	-	-	Y	
1186	08-24-91	5635.8	1600	-395	0.0	10.0	21.0	69.0	Y	Y	Y	-	-	Y	
1190	08-30-91	5637.8	1925	-175	0.0	25.0	17.0	58.0	Y	Y	Y	-	-	Y	
1192	08-30-91	5633.4	1725	-250	10.0	33.0	17.0	40.0	Y	Y	Y	-	-	Y	
1240	08-31-91	5636.7	1775	-375	1.0	15.0	16.0	68.0	Y	Y	Y	-	-	Y	
1241	08-31-91	5634.4	1350	-350	7.0	11.0	17.0	65.0	Y	Y	Y	-	-	Y	
1247	09-01-91	5639.8	1550	-100	0.0	23.0	18.0	59.0	Y	Y	Y	-	-	Y	
1254	08-31-91	5635.0	1945	-120	0.0	16.0	22.0	62.0	Y	N	Y	-	-	N	OLM
1257	09-03-91	5640.3	1660	-165	2.0	18.0	17.0	63.0	Y	Y	Y	-	-	Y	
1260	09-04-91	5640.1	1500	-350	7.0	18.0	16.0	59.0	Y	N	Y	-	-	N	OLM
1268	09-04-91	5632.4	1950	-60	6.0	32.0	20.0	42.0	Y	Y	Y	-	-	Y	
1272	09-05-91	5641.6	1679	-225	2.0	10.0	18.0	70.0	Y	Y	Y	-	-	Y	
1277	09-06-91	5643.3	1550	-358	2.0	16.0	21.0	61.0	Y	Y	Y	-	-	Y	
1298	09-13-91	5638.0	1977	-150	8.0	10.0	20.0	62.0	Y	Y	Y	-	-	Y	
1299	09-15-91	5640.4	1895	-194	0.0	7.0	22.0	71.0	Y	Y	Y	-	-	Y	
1302	09-16-91	5644.4	1800	-90	8.0	18.0	23.0	51.0	Y	Y	Y	-	-	Y	

QUALITY ACCEPTANCE TESTING - SPECIFICATIONS COMPARISON REPORT REPORT NUMBER: RI.0

TEST NUMBER	DATE	ELEV	LOCATION STATION	LOCATION OFFSET	% COBBL	% GRAV	% SAND	% FINES	% COMPACTION DESIGN >= 95%	MOISTURE IN SPEC -3 %- 1 %	GRADATION IN SPEC	GRAVELS IN SPEC > %	FINES IN SPEC < %	TEST IN SPEC	STATUS FAILED TESTS
1305	09-17-91	5638.2	2020	-61	0.0	10.0	23.0	67.0	Y	Y	Y	-	-	Y	
1313	09-18-91	5645.7	1874	-173	2.0	12.0	44.0	42.0	Y	Y	Y	-	-	Y	
1315	09-18-91	5645.3	1500	-136	3.0	16.0	31.0	50.0	Y	Y	Y	-	-	Y	
1325	09-21-91	5647.9	1637	-130	2.0	12.0	20.0	66.0	Y	Y	Y	-	-	Y	
1326	09-21-91	5645.7	1646	-310	6.0	17.0	23.0	54.0	Y	Y	Y	-	-	Y	
1331	09-22-91	5648.8	1515	-73	4.0	18.0	20.0	58.0	Y	Y	Y	-	-	Y	
1333	09-22-91	5648.2	1472	-88	2.0	14.0	20.0	64.0	Y	Y	Y	-	-	Y	
1336	09-22-91	5650.1	1953	-57	2.0	12.0	20.0	66.0	Y	Y	Y	-	-	Y	
1337	09-23-91	5648.3	1550	-200	1.0	3.0	19.0	77.0	Y	N	Y	-	-	N	OLM
1346	09-24-91	5652.0	1777	-91	0.0	6.0	23.0	71.0	Y	Y	Y	-	-	Y	
1337A	09-24-91	5648.2	1540	-194	0.0	4.0	18.0	78.0	Y	Y	Y	-	-	Y	
1348	09-25-91	5647.8	1542	-320	7.0	20.0	17.0	56.0	Y	N	Y	-	-	N	OLM
1352	09-25-91	5652.2	1525	-80	0.0	7.0	16.5	76.5	Y	Y	Y	-	-	Y	
1361	09-28-91	5644.7	1450	-477	1.0	15.0	20.0	64.0	Y	Y	Y	-	-	Y	
1364	09-29-91	5660.8	1698	-65	0.0	6.0	24.0	70.0	Y	Y	Y	-	-	Y	
1366	09-30-91	5656.2	1578	-65	0.0	8.0	22.0	70.0	Y	Y	Y	-	-	Y	
1369	09-30-91	5658.4	2158	-128	0.0	7.0	28.0	65.0	Y	N	Y	-	-	N	OLM
1374	10-01-91	5656.5	1382	-66	3.0	14.0	20.0	63.0	Y	Y	Y	-	-	Y	
1378	10-02-91	5657.8	1586	-343	2.0	13.0	19.0	66.0	Y	Y	Y	-	-	Y	
1390	10-03-91	5657.7	1519	-302	0.0	7.0	17.0	76.0	Y	N	Y	-	-	N	OLM
1397	10-04-91	5650.8	1453	-469	0.0	8.0	23.0	69.0	Y	N	Y	-	-	N	OLM
1399	10-04-91	5659.7	1820	-109	0.0	17.0	19.0	64.0	Y	N	Y	-	-	N	RW,RT
1347	09-24-91	5658.2	1518	-176	0.0	5.0	15.8	79.2	Y	Y	Y	-	-	Y	
1399A	10-06-91	5658.8	1820	-109	0.0	25.0	20.0	55.0	Y	N	Y	-	-	N	OLM
1412	10-07-91	5655.9	1535	-324	5.0	11.0	15.0	69.0	Y	Y	Y	-	-	Y	
1418	10-08-91	5653.2	1782	-380	0.0	3.0	16.0	81.0	Y	Y	Y	-	-	Y	
1421	10-08-91	5662.4	2143	-156	13.0	9.0	13.0	65.0	Y	N	Y	-	-	N	OLM
1425	10-09-91	5661.8	1544	-44	9.0	19.0	23.0	49.0	Y	Y	Y	-	-	Y	
1427	10-09-91	5660.2	1397	-86	0.0	7.0	15.0	78.0	Y	N	Y	-	-	N	OLM
1451	10-10-91	5658.3	1693	-262	0.0	3.0	15.0	82.0	Y	Y	Y	-	-	Y	
1461	10-13-91	5662.0	1980	-194	0.0	10.0	17.0	73.0	Y	Y	Y	-	-	Y	
1466	10-14-91	5656.4	2042	-429	0.0	6.0	17.0	77.0	Y	Y	Y	-	-	Y	
1473	10-16-91	5659.7	1881	-332	0.0	3.0	31.0	66.0	Y	Y	Y	-	-	Y	
1475	10-16-91	5664.5	1473	-119	0.0	9.0	14.0	77.0	Y	Y	Y	-	-	Y	
1484	10-17-91	5663.5	2063	-116	6.0	17.0	17.0	60.0	Y	Y	Y	-	-	Y	
1492	10-18-91	5664.7	1508	-260	0.0	8.0	16.0	76.0	Y	Y	Y	-	-	Y	
1494	10-19-91	5666.2	1403	-140	1.0	20.0	22.0	57.0	Y	Y	Y	-	-	Y	
1497	10-20-91	5668.2	1968	-126	0.0	15.0	17.0	68.0	Y	Y	Y	-	-	Y	
1501	10-22-91	5667.5	1355	-114	0.0	2.0	12.0	86.0	Y	N	Y	-	-	N	OLM
1508	10-22-91	5665.1	1980	-287	0.0	21.0	18.0	61.0	Y	Y	Y	-	-	Y	
1558	04-01-92	5668.2	1918	-62	0.0	8.0	16.0	76.0	Y	Y	Y	-	-	Y	
1564	04-03-92	5668.5	1960	-171	9.0	24.0	20.0	47.0	Y	Y	Y	-	-	Y	
1572	04-06-92	5667.9	1576	-130	1.0	12.0	19.0	68.0	N	N	Y	-	-	N	RW,RT
1575	04-07-92	5666.9	1458	-258	0.0	9.0	18.0	73.0	Y	N	Y	-	-	N	OLM
1572A	04-07-92	5667.9	1576	-130	1.0	12.0	19.0	68.0	Y	Y	Y	-	-	Y	
1587	04-09-92	5669.3	1675	-200	0.0	7.0	15.0	78.0	Y	Y	Y	-	-	Y	
1601	04-10-92	5664.1	1519	-375	0.0	7.0	21.0	72.0	Y	Y	Y	-	-	Y	
1603	04-11-92	5672.6	2040	-117	0.0	9.0	17.0	74.0	Y	Y	Y	-	-	Y	
1607	04-13-92	5665.1	1966	-400	1.0	15.0	23.0	61.0	Y	Y	Y	-	-	Y	
1610	04-14-92	5670.5	1834	-52	0.0	5.0	20.0	75.0	Y	Y	Y	-	-	Y	
1640	04-25-92	5666.5	1846	-354	2.0	21.0	19.0	58.0	Y	Y	Y	-	-	Y	
1642	04-26-92	5669.5	2112	-183	0.0	10.0	24.0	66.0	Y	Y	Y	-	-	Y	

TEST NUMBER	DATE	ELEV	LOCATION STATION	LOCATION OFFSET	% COBBL	% GRAV	% SAND	% FINES	% COMPACTION DESIGN >= 95%	MOISTURE IN SPEC -3 %- 1 %	GRADATION IN SPEC	GRAVELS IN SPEC > %	FINES IN SPEC < %	TEST IN SPEC	STATUS FAILED TESTS
1645	04-27-92	5675.3	1326	-262	0.0	19.0	18.0	63.0	Y	Y	Y	-	-	Y	RW,RT
1654	04-27-92	5670.7	1397	-91	0.0	18.0	22.0	60.0	Y	Y	Y	-	-	Y	
1661	04-28-92	5671.0	2033	-250	0.0	12.0	18.0	70.0	Y	Y	Y	-	-	Y	
1663	04-29-92	5666.5	2146	-348	0.0	9.0	18.0	73.0	Y	Y	Y	-	-	Y	
1645A	04-29-92	5667.4	1337	-271	0.0	19.0	18.0	63.0	Y	Y	Y	-	-	Y	
1672	04-30-92	5673.7	1800	-139	0.0	7.0	17.0	76.0	Y	N	Y	-	-	N	OLM
1678	05-01-92	5667.8	1922	-300	0.0	7.0	19.0	74.0	Y	Y	Y	-	-	Y	
1680	05-02-92	5673.0	2200	-61	0.0	7.0	20.0	73.0	Y	Y	Y	-	-	Y	
1687	05-04-92	5673.3	1502	-197	0.0	6.0	16.0	78.0	Y	Y	Y	-	-	Y	
1694	05-05-92	5672.5	1441	-288	0.0	10.0	19.0	71.0	Y	N	Y	-	-	N	OLM
1700	05-06-92	5677.3	1503	-113	0.0	14.0	22.0	64.0	Y	Y	Y	-	-	Y	
1702	05-07-92	5671.3	1584	-385	1.0	12.0	21.0	66.0	Y	Y	Y	-	-	Y	
1703	05-08-92	5680.9	1852	-61	0.0	8.0	14.0	78.0	Y	Y	Y	-	-	Y	
1707	05-11-92	5673.1	1981	-345	2.0	15.0	18.0	65.0	Y	Y	Y	-	-	Y	
1712	05-12-92	5680.3	1676	-128	0.0	12.0	23.0	65.0	Y	Y	Y	-	-	Y	
1715	05-12-92	5679.3	1828	-206	0.0	9.0	22.0	69.0	Y	Y	Y	-	-	Y	
1716	05-14-92	5683.7	1696	-228	0.0	11.0	16.0	73.0	Y	Y	Y	-	-	Y	
1721	05-14-92	5677.1	1618	-296	0.0	8.0	14.0	78.0	Y	Y	Y	-	-	Y	
1723	05-15-92	5676.7	1421	-332	0.0	12.0	19.0	69.0	Y	Y	Y	-	-	Y	
1726	05-16-92	5689.8	1716	-59	0.0	3.0	15.0	82.0	Y	Y	Y	-	-	Y	
1728	05-16-92	5677.4	2040	-326	7.0	25.0	17.0	51.0	Y	Y	Y	-	-	Y	
1730	05-16-92	5679.2	1809	-300	0.0	9.0	19.0	72.0	Y	Y	Y	-	-	Y	
1732	05-17-92	5679.6	1882	-308	1.0	21.0	17.0	61.0	Y	Y	Y	-	-	Y	
1734	05-17-92	5681.9	1452	-195	0.0	13.0	13.0	74.0	Y	Y	Y	-	-	Y	
1736	05-18-92	5682.9	1662	-245	4.0	5.0	20.0	71.0	Y	Y	Y	-	-	Y	
1742	05-19-92	5685.4	1550	-122	3.0	26.0	17.0	54.0	Y	Y	Y	-	-	Y	
1750	05-27-92	5682.2	1313	-178	0.0	19.0	20.0	61.0	Y	Y	Y	-	-	Y	
1752	05-27-92	5683.4	1828	-300	2.0	22.0	18.0	58.0	N	Y	Y	-	-	N	OLD
1756	05-27-92	5687.3	1569	-73	0.0	11.0	17.0	72.0	Y	Y	Y	-	-	Y	
1759	05-28-92	5685.4	2114	-216	3.0	19.0	19.0	59.0	Y	Y	Y	-	-	Y	
1762	05-28-92	5685.3	1577	-252	2.0	25.0	19.0	54.0	Y	Y	Y	-	-	Y	
1764	05-29-92	5684.2	1383	-242	0.0	13.0	21.0	66.0	Y	Y	Y	-	-	Y	
1767	05-29-92	5687.1	1477	-114	0.0	9.0	14.0	77.0	Y	Y	Y	-	-	Y	
1768	05-29-92	5687.5	2236	-75	0.0	22.0	17.0	61.0	Y	N	Y	-	-	N	OLM
1772	05-30-92	5687.9	1550	-200	0.0	10.0	18.0	72.0	Y	Y	Y	-	-	Y	
1776	05-31-92	5690.4	2075	-112	2.0	20.0	20.0	58.0	Y	Y	Y	-	-	Y	
1780	06-01-92	5690.5	1594	-94	2.0	13.0	23.0	62.0	Y	Y	Y	-	-	Y	
1782	06-01-92	5692.0	1790	-68	0.0	9.0	14.0	77.0	Y	Y	Y	-	-	Y	
1786	06-02-92	5685.9	2200	-324	0.0	5.0	17.0	78.0	Y	N	Y	-	-	N	OLM
1787	06-02-92	5687.7	1279	-179	1.0	16.0	17.0	66.0	Y	Y	Y	-	-	Y	
1791	06-02-92	5689.4	2253	-140	1.0	18.0	19.0	62.0	Y	N	Y	-	-	N	OLM
1792	06-03-92	5690.3	1446	-183	0.0	3.0	17.0	80.0	Y	Y	Y	-	-	Y	
1796	06-03-92	5686.7	1890	-348	0.0	11.0	19.0	70.0	Y	N	Y	-	-	N	OLM
1798	06-04-92	5691.0	1724	-271	8.0	30.0	22.0	40.0	Y	N	Y	-	-	N	OLM
1803	06-05-92	5692.0	2260	-168	0.0	3.0	20.0	77.0	Y	Y	Y	-	-	Y	
1817	06-08-92	5689.4	1471	-322	0.0	11.0	19.0	70.0	Y	Y	Y	-	-	Y	
1819	06-08-92	5695.4	1927	-75	1.0	10.0	17.0	72.0	Y	Y	Y	-	-	Y	
1821	06-09-92	5692.3	2189	-200	0.0	6.0	12.0	82.0	Y	Y	Y	-	-	Y	
1825	06-10-92	5693.1	1772	-275	0.0	3.0	15.0	82.0	Y	Y	Y	-	-	Y	
1830	06-10-92	5694.2	1354	-66	1.0	11.0	16.0	72.0	Y	Y	Y	-	-	Y	
1836	06-11-92	5695.3	2295	-162	2.0	16.0	16.0	66.0	Y	Y	Y	-	-	Y	
1840	06-11-92	5693.7	1717	-300	4.0	26.0	25.0	45.0	Y	Y	Y	-	-	Y	

TEST NUMBER	DATE	ELEV	LOCATION STATION	LOCATION OFFSET	% COBBL	% GRAV	% SAND	% FINES	% COMPACTION DESIGN >= 95%	MOISTURE IN SPEC -3 %- 1 %	GRADATION IN SPEC	GRAVELS IN SPEC > %	FINES IN SPEC < %	TEST IN SPEC	STATUS FAILED TESTS
1847	06-12-92	5697.7	1545	-91	0.0	7.0	20.0	73.0	Y	Y	Y	-	-	Y	
1850	06-13-92	5699.5	1650	-122	1.0	20.0	21.0	58.0	Y	Y	Y	-	-	Y	
1852	06-18-92	5696.2	1918	-235	0.0	6.0	16.0	78.0	Y	Y	Y	-	-	Y	
1854	06-18-92	5697.1	1403	-205	0.0	9.0	19.0	72.0	Y	Y	Y	-	-	Y	
1856	06-19-92	5700.7	1851	-123	11.0	13.0	22.0	54.0	Y	Y	N	-	-	N	
1862	06-19-92	5697.2	1932	-303	3.0	17.0	18.0	62.0	Y	Y	Y	-	-	Y	
1866	06-20-92	5700.2	1454	-118	5.0	25.0	22.0	48.0	Y	Y	Y	-	-	Y	
1869	06-21-92	5696.7	1595	-331	6.0	21.0	20.0	53.0	Y	Y	Y	-	-	Y	
1871	06-22-92	5698.4	1303	-230	0.0	15.0	24.0	61.0	Y	Y	Y	-	-	Y	
1872	06-23-92	5701.8	1622	-225	3.0	16.0	17.0	64.0	Y	Y	Y	-	-	Y	
1879	06-23-92	5698.7	2183	-308	4.0	20.0	28.0	48.0	Y	Y	Y	-	-	Y	
1881	06-23-92	5702.8	2093	-64	0.0	12.0	16.0	72.0	Y	Y	Y	-	-	Y	
1887	06-24-92	5704.0	1952	-169	4.0	18.0	18.0	60.0	Y	Y	Y	-	-	Y	
1888	06-25-92	5703.3	1496	-200	4.0	19.0	20.0	57.0	Y	Y	Y	-	-	Y	
1896	06-25-92	5706.3	1761	-60	0.0	14.0	18.0	68.0	Y	Y	Y	-	-	Y	
1899	06-26-92	5701.6	1469	-311	2.0	21.0	19.0	58.0	Y	Y	Y	-	-	Y	
1906	06-27-92	5708.0	1760	-70	2.0	20.0	19.0	59.0	Y	Y	Y	-	-	Y	
1909	06-27-92	5705.9	2254	-69	1.0	8.0	23.0	68.0	Y	Y	Y	-	-	Y	
1912	06-28-92	5706.1	2109	-180	0.0	10.0	20.0	70.0	Y	Y	Y	-	-	Y	
1918	06-29-92	5705.6	1364	-127	0.0	12.0	22.0	66.0	Y	N	Y	-	-	N	OLM
1921	06-29-92	5708.5	1670	-218	0.0	13.0	19.0	68.0	Y	Y	Y	-	-	Y	
1932	07-02-92	5709.8	1645	-300	0.0	9.0	18.0	73.0	Y	Y	Y	-	-	Y	
1934	07-03-92	5710.5	1531	-65	5.0	8.0	14.0	73.0	Y	Y	Y	-	-	Y	
1938	07-03-92	5708.1	2275	-205	7.0	13.0	20.0	60.0	Y	Y	N	-	-	N	
1943	07-06-92	5710.5	2020	-213	0.0	5.0	20.0	75.0	Y	Y	Y	-	-	Y	
1947	07-07-92	5713.2	1605	-87	2.0	18.0	17.0	63.0	Y	N	Y	-	-	N	OLM
1952	07-07-92	5709.6	2117	-271	3.0	26.0	21.0	50.0	Y	N	Y	-	-	N	OLM
1957	07-08-92	5714.5	1653	-271	1.0	16.0	18.0	65.0	Y	Y	Y	-	-	Y	
1959	07-08-92	5712.2	2100	-163	0.0	17.0	22.0	61.0	Y	Y	Y	-	-	Y	
1965	07-09-92	5715.3	1474	-163	0.0	7.0	15.0	78.0	Y	Y	Y	-	-	Y	
1968	07-10-92	5717.6	1835	-127	0.0	9.0	16.0	75.0	Y	Y	Y	-	-	Y	
1971	07-10-92	5712.7	2239	-264	0.0	9.0	22.0	69.0	Y	Y	Y	-	-	Y	
1974	07-11-92	5712.7	1235	-88	0.0	6.0	19.0	75.0	Y	Y	Y	-	-	Y	
1978	07-15-92	5714.0	2281	-63	0.0	4.0	16.0	80.0	Y	Y	Y	-	-	Y	
1980	07-15-92	5718.4	1550	-174	0.0	13.0	20.0	67.0	Y	Y	Y	-	-	Y	
1985	07-16-92	5714.2	1240	-213	0.0	28.0	26.0	46.0	Y	Y	Y	-	-	Y	
1988	07-16-92	5718.2	2035	-60	4.0	15.0	22.0	59.0	Y	Y	Y	-	-	Y	
1989	07-17-92	5714.6	2302	-229	0.0	13.0	23.0	64.0	Y	Y	Y	-	-	Y	
1992	07-17-92	5719.6	2135	-77	0.0	14.0	22.0	64.0	Y	Y	Y	-	-	Y	
1994	07-18-92	5718.6	2350	-75	2.0	4.0	18.0	76.0	Y	Y	Y	-	-	Y	
2003	07-18-92	5722.4	1848	-198	2.0	7.0	16.0	75.0	Y	Y	Y	-	-	Y	
2005	07-19-92	5709.4	1200	-359	1.0	17.0	31.0	51.0	Y	Y	Y	-	-	Y	
2008	07-20-92	5721.0	1540	-246	9.0	16.0	25.0	50.0	Y	N	N	-	-	N	OLM
2010	07-20-92	5722.2	1619	-250	0.0	9.0	23.0	68.0	Y	Y	Y	-	-	Y	
2014	07-20-92	5724.1	1759	-50	0.0	12.0	19.0	69.0	Y	Y	Y	-	-	Y	
2017	07-21-92	5719.7	2214	-164	0.0	8.0	19.0	73.0	Y	Y	Y	-	-	Y	
2021	07-21-92	5720.0	1294	-209	0.0	7.0	16.0	77.0	Y	Y	Y	-	-	Y	
2027	07-22-92	5724.1	1412	-153	0.0	11.0	23.0	66.0	Y	Y	Y	-	-	Y	
2032	07-23-92	5724.5	1758	-250	6.0	22.0	20.0	52.0	Y	Y	Y	-	-	Y	
2037	07-24-92	5722.8	2050	-253	1.0	16.0	27.0	56.0	Y	Y	Y	-	-	Y	
2040	07-24-92	5727.4	1389	-99	3.0	16.0	23.0	58.0	Y	Y	Y	-	-	Y	
2044	07-27-92	5728.2	1688	-159	0.0	11.0	22.0	67.0	Y	Y	Y	-	-	Y	

TEST NUMBER	DATE	ELEV	LOCATION		% COBBL	% GRAV	% SAND	% FINES	% COMPACTION DESIGN >= 95%	MOISTURE IN SPEC -3 %- 1 %	GRADATION IN SPEC	GRAVELS IN SPEC > %	FINES IN SPEC < %	TEST IN SPEC	STATUS FAILED TESTS
			STATION	OFFSET											
2046	07-27-92	5725.4	2103	-88	4.0	13.0	19.0	64.0	Y	Y	Y	-	-	Y	
2056	07-28-92	5727.6	1261	-235	1.0	13.0	25.0	61.0	Y	Y	Y	-	-	Y	
2058	07-29-92	5727.8	1963	-50	13.0	9.0	17.0	61.0	Y	Y	Y	-	-	Y	
2061	07-29-92	5728.6	2034	-128	0.0	8.0	18.0	74.0	Y	Y	Y	-	-	Y	
2065	07-30-92	5731.5	1365	-88	0.0	10.0	16.0	74.0	Y	Y	Y	-	-	Y	
2071	07-30-92	5732.7	1692	-125	0.0	11.0	18.0	71.0	Y	Y	Y	-	-	Y	
2077	07-30-92	5730.4	2039	-170	2.0	6.0	18.0	74.0	Y	Y	Y	-	-	Y	
2079	07-31-92	5733.1	1748	-131	0.0	6.0	21.0	73.0	Y	Y	Y	-	-	Y	
2082	07-31-92	5732.5	1532	-51	0.0	12.0	19.0	69.0	Y	N	Y	-	-	N	OLM
2084	07-31-92	5731.6	2084	-195	1.0	16.0	20.0	63.0	Y	N	Y	-	-	N	OLM
2087	08-01-92	5736.0	1418	-197	0.0	6.0	20.0	74.0	Y	N	Y	-	-	N	OLM
2101	08-03-92	5731.4	2164	-212	5.0	16.0	27.0	52.0	Y	Y	Y	-	-	Y	
2102	08-03-92	5734.7	1836	-61	1.0	17.0	20.0	62.0	Y	Y	Y	-	-	Y	
2107	08-04-92	5733.9	1891	-226	0.0	4.0	17.0	79.0	Y	N	Y	-	-	N	OLM
2110	08-04-92	5731.1	2330	-145	0.0	5.0	15.0	80.0	Y	Y	Y	-	-	Y	
2113	08-05-92	5732.6	1229	-64	2.0	12.0	31.0	55.0	Y	Y	Y	-	-	Y	
2116	08-05-92	5738.2	1627	-209	2.0	15.0	16.0	67.0	Y	Y	Y	-	-	Y	
2119	08-06-92	5730.1	2446	-77	2.0	13.0	17.0	68.0	Y	Y	Y	-	-	Y	
2124	08-07-92	5732.7	1204	-59	1.0	16.0	19.0	64.0	Y	Y	Y	-	-	Y	
2125	08-07-92	5739.6	1801	-51	0.0	8.0	19.0	73.0	Y	Y	Y	-	-	Y	
2131	08-10-92	5743.3	1550	-140	4.0	4.0	21.0	71.0	Y	Y	Y	-	-	Y	
2132	08-10-92	5744.4	1575	-191	1.0	8.0	19.0	72.0	Y	Y	Y	-	-	Y	
2140	08-11-92	5733.3	2496	-56	0.0	10.0	26.0	64.0	Y	Y	Y	-	-	Y	
2144	08-12-92	5740.7	1260	-94	0.0	7.0	23.0	70.0	Y	Y	Y	-	-	Y	
2155	08-13-92	5743.7	1519	-62	5.0	22.0	23.0	50.0	Y	Y	Y	-	-	Y	
2157	08-13-92	5743.0	2157	-198	0.0	11.0	21.0	68.0	Y	Y	Y	-	-	Y	
2176	08-14-92	5747.3	1397	-121	0.0	10.0	26.0	64.0	Y	Y	Y	-	-	Y	
2180	08-15-92	5745.3	1976	-49	7.0	27.0	21.0	45.0	Y	Y	Y	-	-	Y	
2182	08-15-92	5749.4	1510	-147	1.0	22.0	24.0	53.0	Y	Y	Y	-	-	Y	
2189	08-17-92	5748.2	1557	-78	3.0	13.0	25.0	59.0	Y	Y	Y	-	-	Y	
2193	08-18-92	5744.4	2405	-140	0.0	2.0	19.0	79.0	Y	Y	Y	-	-	Y	
2197	08-18-92	5749.2	1784	-143	0.0	3.0	7.0	90.0	Y	Y	Y	-	-	Y	
2199	08-19-92	5748.9	1305	-119	0.0	3.0	25.0	72.0	Y	N	Y	-	-	N	OLM
2200	08-19-92	5748.8	2206	-93	0.0	8.0	34.0	58.0	Y	Y	Y	-	-	Y	
2203	08-19-92	5746.8	2497	-176	2.0	11.0	22.4	64.6	Y	Y	Y	-	-	Y	
2205	08-20-92	5748.9	1240	-183	0.0	5.0	21.2	73.8	Y	Y	Y	-	-	Y	
2209	08-21-92	5753.9	1749	-43	0.0	8.0	18.0	74.0	Y	Y	Y	-	-	Y	
2218	08-23-92	5753.4	1359	-64	0.0	3.0	22.9	74.1	Y	Y	Y	-	-	Y	
2222	08-24-92	5752.3	2147	-177	0.0	1.7	16.2	82.1	Y	N	Y	-	-	N	OLM
2224	08-25-92	5751.6	2247	-153	0.0	8.0	31.0	61.0	Y	Y	Y	-	-	Y	
2228	08-26-92	5757.3	1503	-47	0.0	29.0	46.0	25.0	Y	Y	Y	-	-	Y	
2229	08-26-92	5757.1	1486	-110	0.0	18.0	28.0	54.0	Y	Y	Y	-	-	Y	
2232	08-26-92	5755.9	2229	-110	0.0	13.0	24.0	63.0	Y	N	Y	-	-	N	OLM
2235	08-27-92	5755.7	2534	-62	16.0	17.0	29.0	38.0	Y	Y	N	-	-	N	
2242	08-28-92	5759.0	1208	-67	6.0	17.0	33.0	44.0	Y	Y	Y	-	-	Y	
2251	08-29-92	5758.2	2056	-56	1.0	20.0	34.0	45.0	Y	Y	Y	-	-	Y	
2252	08-29-92	5759.9	1914	-139	0.0	11.0	21.0	68.0	Y	Y	Y	-	-	Y	
2255	08-30-92	5763.2	1592	-85	0.0	11.0	35.0	54.0	Y	Y	Y	-	-	Y	
2258	08-30-92	5763.1	1396	-137	0.0	8.0	25.0	67.0	Y	Y	Y	-	-	Y	
2261	09-01-92	5760.0	2338	-71	0.0	6.0	18.0	76.0	Y	Y	Y	-	-	Y	
2262	09-01-92	5763.8	1334	-88	0.0	6.0	21.0	73.0	Y	Y	Y	-	-	Y	
2275	09-03-92	5764.7	1413	-45	3.0	16.0	26.0	55.0	Y	Y	Y	-	-	Y	

QUALITY ACCEPTANCE TESTING - SPECIFICATIONS COMPARISON REPORT REPORT NUMBER: RI.0

TEST NUMBER	DATE	ELEV	LOCATION STATION	LOCATION OFFSET	% COBBL	% GRAV	% SAND	% FINES	% COMPACTION DESIGN >= 95%	MOISTURE IN SPEC -3 %- 1 %	GRADATION IN SPEC	GRAVELS IN SPEC > %	FINES IN SPEC < %	TEST IN SPEC	STATUS FAILED TESTS
2279	09-08-92	5767.5	1519	-59	0.0	9.0	17.0	74.0	Y	Y	Y	-	-	Y	
2280	09-09-92	5762.7	2505	-85	2.0	9.0	23.0	66.0	Y	Y	Y	-	-	Y	
2288	09-10-92	5767.2	2518	-39	0.0	27.0	24.0	49.0	Y	Y	Y	-	-	Y	
2292	09-10-92	5767.3	1758	-111	0.0	15.0	19.0	66.0	Y	Y	Y	-	-	Y	
2294	09-11-92	5766.9	2482	-110	0.0	7.0	16.0	77.0	Y	Y	Y	-	-	Y	
2301	09-12-92	5770.3	2583	-91	2.0	9.0	20.0	69.0	Y	Y	Y	-	-	Y	
2302	09-12-92	5772.1	2071	-49	0.0	14.0	16.0	70.0	Y	N	Y	-	-	N	OLM
2305	09-13-92	5774.5	1541	-44	5.0	23.0	23.0	49.0	Y	Y	Y	-	-	Y	
2307	09-13-92	5774.9	1815	-66	3.0	18.0	17.0	62.0	Y	Y	Y	-	-	Y	
2310	09-13-92	5775.0	1800	-77	1.0	11.0	24.0	64.0	Y	Y	Y	-	-	Y	
2313	09-14-92	5775.2	1376	-72	0.0	7.0	25.0	68.0	Y	N	Y	-	-	N	OLM
2316	09-15-92	5775.8	1161	-89	0.0	20.0	21.0	59.0	Y	Y	Y	-	-	Y	
2320	09-16-92	5778.6	2092	-72	0.0	13.0	19.0	68.0	Y	Y	Y	-	-	Y	
2322	09-16-92	5780.1	2155	-49	0.0	15.0	17.0	68.0	Y	Y	Y	-	-	Y	
2330	09-17-92	5779.4	1230	-86	0.0	17.0	24.0	59.0	Y	Y	Y	-	-	Y	
2333	09-18-92	5776.9	2577	-61	0.0	5.0	19.0	76.0	Y	Y	Y	-	-	Y	RW
2334	09-18-92	5783.1	1402	-73	0.0	11.0	24.0	65.0	Y	Y	Y	-	-	Y	
2339	09-18-92	5777.5	2573	-58	2.0	18.0	25.0	55.0	Y	Y	Y	-	-	Y	
2350	09-22-92	5785.0	2631	-68	7.0	29.0	18.0	46.0	Y	Y	Y	-	-	Y	
2351	09-22-92	5790.3	2252	-41	8.0	32.0	18.0	42.0	Y	Y	Y	-	-	Y	
2355	09-22-92	5798.8	1796	-35	1.0	36.0	20.0	43.0	Y	Y	Y	-	-	Y	
2358	09-23-92	5788.9	2502	-48	3.0	22.0	20.0	55.0	Y	Y	Y	-	-	Y	
2362	09-25-92	5788.3	2650	-50	7.0	40.0	22.0	31.0	Y	Y	Y	-	-	Y	
2370	09-25-92	5796.4	1171	-43	0.0	11.0	21.0	68.0	Y	Y	Y	-	-	Y	
2372	09-26-92	5792.8	2610	-42	23.0	32.0	24.0	21.0	Y	Y	Y	-	-	Y	
2381	09-30-92	5804.0	1475	-22	6.0	48.0	23.0	23.0	Y	Y	Y	-	-	Y	
2384	10-02-92	5804.7	2485	-23	24.0	33.0	20.0	23.0	Y	Y	N	-	-	N	

NOTE: These statistics include only results of tests that are NOT designated as RM, RW, or RW,RT.

	% COMPACTION	MOISTURE	GRADATION	GRAVELS	FINES	TEST IN SPEC
FAILING TEST LOCATIONS	7	49	5	0	0	59
PASSING TEST LOCATIONS	318	276	320	0	0	266
TOTAL TEST LOCATIONS	325	325	325	0	0	325
% FAILING TEST LOCATIONS	2.2	15.1	1.5	0.0	0.0	18.2

REMARKS LEGEND

- RM - Test Location Removed
- RW - Test Loc. Reworked and NOT Retested
- RW,RT - Test Loc. Reworked and Retested
- AR - Additional Rolling at Test Location

TEST LOCATIONS REWORKED - UNTESTED..	2
TEST LOCATIONS REWORKED - RETESTED..	3
TEST LOCATIONS REMOVED.............	0
FAILED TEST LOCATIONS NOT REWORKED OR RETESTED..	59
PERCENT OF FAILED TEST LOCATIONS NOT REWORKED OR RETESTED IN PERMANENT FILL..	18.2

COMMENT: THIS REPORT COVERS THE ENTIRE CONSTRUCTION OF THE DAM.

LAB CHIEF: ______________________

SUBMITTED BY: ______________________
PROJECT ENGINEER

QUALITY ACCEPTANCE TESTING - GRADATIONS REPORT	REPORT NUMBER: RI.1	PAGE 1 OF 7
PROJECT: LITTLE DELL LAKE, DAM AND APPURTENANCES RIVER: SALT LAKE CITY STREAMS STATE: UTAH TOWN: SALT LAKE CITY	CONTRACT NO. DACW05-89-C-0045 CONTRACTOR: CLEMENT BROTHERS AND J.E. STARNES CO.	DATE OF REPORT: 12-07-92 01-01-90 THRU 12-31-92

EMBANKMENT ZONE	MIN. DESIGNED % COMP	SPEC. W.C. % RANGE	LOOSE LIFT THICK. (IN)	NUMBER OF PASSES	COMPACTION EQUIPMENT
RANDOM I	95	-3 TO 1	8	6	CAT 825C, SP-60

TEST NUMBER	DATE	ELEV	LOCATION		GRADATION - PERCENT PASSING										LL	PI	CLASSIFICATION
			STATION	OFFSET	8 IN	3 IN	1 IN	3/4IN	3/8IN	# 4	# 10	# 40	#100	#200			
581	10-28-90	5585.0	1520	-100	100.0	97.0	94.0	94.0	92.0	91.0	89.0	87.0	82.0	71.0			CL WITH SA
781	06-18-91	5584.6	1500	-200	100.0	100.0	97.0	96.0	95.0	93.0	91.0	87.0	71.0	58.0	42.0	25.0	SA CL
786	06-19-91	5583.6	1585	-315	100.0	97.0	94.0	93.0	90.0	87.0	85.0	81.0	73.0	61.0	40.0	24.0	SA CL WITH GR
790	06-20-91	5581.9	1550	-305	100.0	100.0	98.0	97.0	95.0	93.0	91.0	89.0	81.0	70.0	41.0	25.0	SA CL
793	06-21-91	5587.6	1600	-250	100.0	100.0	98.0	97.0	94.0	92.0	90.0	84.0	71.0	58.0	35.0	20.0	SA CL
796	06-21-91	5589.2	1550	-200	100.0	100.0	100.0	99.0	98.0	97.0	96.0	94.0	88.0	75.0	41.0	26.0	CL WITH SA
802	06-24-91	5588.2	1465	-250	100.0	97.0	91.0	90.0	88.0	87.0	85.0	83.0	78.0	70.0	42.0	26.0	SA CL
804	06-24-91	5589.6	1625	-325	100.0	100.0	99.0	99.0	96.0	94.0	92.0	89.0	82.0	68.2	38.0	21.0	SA CL
808	06-25-91	5590.7	1550	-250	100.0	95.0	91.0	89.0	87.0	84.0	82.0	79.0	76.0	63.0	51.0	34.0	SA CH
811	06-25-91	5574.3	1500	-505	100.0	100.0	93.0	92.0	90.0	88.0	87.0	84.0	79.0	69.0	41.0	25.0	SA CL
812	06-26-91	5576.8	1500	-500	100.0	100.0	100.0	99.0	96.0	94.0	92.0	89.0	83.0	73.0	44.0	28.0	CL WITH SA
823	06-27-91	5583.4	1450	-375	100.0	100.0	98.0	98.0	95.0	93.0	92.0	89.0	83.0	70.0	36.0	22.0	SA CL
829	06-28-91	5580.2	1525	-550	100.0	99.0	95.0	94.0	92.0	90.0	89.0	86.0	80.0	66.0	41.0	25.0	SA CL
833	06-29-91	5572.8	1400	-625	100.0	100.0	100.0	99.0	99.0	98.0	97.0	95.0	89.0	75.0	30.0	16.0	CL WITH SA
834	06-28-91	5571.6	1475	-642	100.0	93.0	88.0	87.0	84.0	82.0	81.0	79.0	74.0	67.0	36.0	20.0	SA CL
843	06-29-91	5587.3	1650	-200	100.0	100.0	98.0	95.0	89.0	86.0	81.0	76.0	69.0	60.0	39.0	25.0	SA CL
848	07-01-91	5584.1	1500	-550	100.0	100.0	94.0	93.0	91.0	89.0	87.0	85.0	81.0	73.0	40.0	25.0	CL WITH SA
850	07-01-91	5589.9	1550	-350	100.0	99.0	93.0	93.0	91.0	89.0	88.0	85.0	80.0	67.0	35.0	21.0	SA CL
853	07-02-91	5586.6	1350	-400	100.0	99.0	99.0	99.0	96.0	95.0	93.0	90.0	82.0	69.0	33.0	20.0	SA CL
859	07-02-91	5588.9	1500	-450	100.0	100.0	94.0	93.0	91.0	90.0	88.0	86.0	78.0	64.0	35.0	21.0	SA CL
860	07-03-91	5590.0	1500	-500	100.0	94.0	90.0	89.0	87.0	85.0	84.0	82.0	76.0	65.0	39.0	23.0	SA CL
861	07-03-91	5593.6	1730	-400	100.0	100.0	99.0	98.0	96.0	94.0	92.0	88.0	82.0	72.0	34.0	18.0	CL WITH SA
862	07-03-91	5593.1	1600	-250	100.0	100.0	100.0	99.0	97.0	95.0	93.0	90.0	85.0	73.0	39.0	23.0	CL WITH SA
863	07-04-91	5593.1	1400	-150	100.0	99.0	98.0	97.0	96.0	94.0	92.0	89.0	83.0	69.0	37.0	22.0	SA CL
864	07-04-91	5589.9	1400	-400	100.0	100.0	98.0	97.0	96.0	94.0	93.0	91.0	84.0	69.0	39.0	26.0	SA CL
865	07-05-91	5589.7	1400	-375	100.0	100.0	98.0	98.0	95.0	93.0	91.0	88.0	81.0	68.0	35.0	22.0	SA CL
868	07-05-91	5594.6	1575	-250	100.0	100.0	97.0	96.0	93.0	92.0	91.0	89.0	83.0	71.0	37.0	24.0	CL WITH SA
875	07-09-91	5590.4	1425	-475	100.0	100.0	97.0	95.0	94.0	92.0	90.0	88.0	83.0	76.0	53.0	35.0	CH WITH SA
876	07-09-91	5595.3	1550	-350	100.0	98.0	91.0	87.0	81.0	76.0	72.0	68.0	62.0	50.0	33.0	18.0	SA CL WITH GR
882	07-15-91	5595.3	1475	-275	100.0	100.0	99.0	99.0	97.0	95.0	93.0	89.0	83.0	70.0	37.0	20.0	SA CL
892	07-10-91	5574.7	1400	-725	100.0	100.0	99.0	98.0	97.0	96.0	95.0	93.0	87.0	73.0	45.0	28.0	CL WITH SA
894	07-10-91	5585.0	1517	-550	100.0	100.0	99.0	98.0	96.0	95.0	94.0	92.0	86.0	74.0	41.0	26.0	CL WITH SA
897	07-12-91	5577.8	1475	-750	100.0	100.0	98.0	98.0	97.5	97.4	97.0	94.0	90.0	85.0	38.0	23.0	CL WITH SA
900	07-12-91	5588.0	1450	-700	100.0	100.0	100.0	100.0	99.0	98.0	97.5	96.0	94.0	87.8	42.0	28.0	CL
901	07-13-91	5582.6	1450	-720	100.0	100.0	99.0	99.0	98.0	97.0	96.0	94.0	91.0	83.8	45.0	29.0	CL WITH SA
903	07-15-91	5595.0	1475	-400	100.0	98.0	87.0	83.0	77.0	72.0	68.0	63.0	55.0	45.0			SC WITH GR
910	07-16-91	5593.7	1400	-550	100.0	100.0	99.0	98.0	96.0	95.0	94.0	91.0	88.0	81.7	41.0	29.0	CL WITH SA
912	07-15-91	5598.5	1600	-375	100.0	100.0	100.0	99.0	99.0	98.5	98.0	95.0	85.0	69.6	36.0	22.0	SA CL
915	07-17-91	5591.4	1375	-650	100.0	100.0	100.0	100.0	99.0	99.0	98.5	98.0	96.0	91.1	40.0	26.0	CL
929	07-17-91	5598.7	1550	-520	100.0	99.0	97.0	96.0	93.0	91.0	88.0	82.0	75.0	68.3	31.0	16.0	SA CL
930	07-18-91	5600.0	1450	-400	100.0	100.0	97.0	96.0	93.0	91.0	88.0	85.0	81.0	75.9	52.0	36.0	CH WITH SA
934	07-18-91	5597.3	1490	-105	100.0	98.0	93.0	93.0	91.0	89.0	88.0	85.0	76.0	66.0	32.0	16.0	SA CL
938	07-22-91	5604.4	1625	-450.	100.0	100.0	98.0	96.0	92.0	89.0	86.0	82.0	77.0	70.0	40.0	25.0	SA CL

QUALITY ACCEPTANCE TESTING - GRADATIONS REPORT REPORT NUMBER: RI.1

TEST NUMBER	DATE	ELEV	LOCATION		GRADATION - PERCENT PASSING										LL	PI	CLASSIFICATION
			STATION	OFFSET	8 IN	3 IN	1 IN	3/4IN	3/8IN	# 4	# 10	# 40	#100	#200			
939	07-23-91	5600.5	1525	-140	100.0	100.0	95.0	93.0	89.0	85.0	82.0	78.0	72.0	62.6	37.0	22.0	SA CL WITH GR
947	07-23-91	5602.4	1400	-250	100.0	100.0	97.0	96.0	93.0	91.0	89.0	86.0	81.0	73.0	38.0	25.0	CL WITH SA
950	07-24-91	5600.5	1450	-550	100.0	97.0	86.0	83.0	77.0	72.0	69.0	65.0	59.0	48.0			GC WITH SA
956	07-24-91	5600.8	1440	-480	100.0	100.0	97.0	95.0	91.0	87.0	84.0	78.0	71.0	61.0	39.0	26.0	SA CL
957	07-25-91	5603.9	1600	-150	100.0	100.0	93.0	91.0	86.0	82.0	79.0	74.0	67.0	57.0			SA CL WITH GR
963	07-26-91	5603.5	1590	-600	100.0	100.0	91.0	90.0	87.0	84.0	81.0	77.0	71.0	62.0	40.0	29.0	SA CL WITH GR
969	07-26-91	5602.2	1450	-150	100.0	100.0	99.0	97.0	95.0	93.0	90.0	86.0	80.0	69.0	42.0	30.0	SA CL
981	07-29-91	5609.9	1675	-200	100.0	98.0	85.0	82.0	76.0	72.0	68.0	65.0	62.0	54.0	39.0	27.0	GR CL WITH SA
983	07-30-91	5608.2	1440	-400	100.0	100.0	90.0	87.0	82.0	79.0	76.0	71.0	66.0	59.0			GR CL WITH SA
992	08-01-91	5610.0	1600	-550	100.0	97.0	88.0	86.0	80.0	77.0	74.0	71.0	66.0	57.0			SA CL WITH GR
1000	08-01-91	5611.4	1450	-450	100.0	96.0	86.0	83.0	77.0	73.0	70.0	67.0	63.0	56.3	41.0	29.0	GR CL WITH SA
1004	08-02-91	5617.1	1700	-400	100.0	100.0	98.0	97.0	95.0	93.0	91.0	89.0	84.0	75.0			CL WITH SA
1011	08-03-91	5611.2	1400	-340	100.0	94.0	86.0	82.0	74.0	69.0	64.0	59.0	53.0	43.0			GC WITH SA
1015	08-05-91	5618.7	1725	-450	100.0	94.0	80.0	79.0	75.0	73.0	72.0	69.0	66.0	59.0			GR CL WITH SA
1021	08-06-91	5620.1	1550	-475	100.0	95.0	86.0	84.0	82.0	80.0	77.0	72.0	67.0	60.0	41.0	21.0	SA CL WITH GR
1022	08-06-91	5616.2	1700	-250	100.0	92.0	77.0	72.0	64.0	59.0	55.0	50.0	44.0	37.0			GC WITH SA
1031	08-07-91	5615.5	1425	-300	100.0	100.0	98.0	96.0	94.0	92.0	89.0	82.0	77.0	70.0			CL WITH SA.
1042	08-08-91	5622.1	1560	-195	100.0	99.0	88.0	83.0	76.0	71.0	67.0	61.0	55.0	46.0			GC WITH SA
1048	08-09-91	5619.7	1450	-150	100.0	97.0	75.0	72.0	63.0	57.0	53.0	49.0	44.0	35.0			GC WITH SA
1053	08-10-91	5624.6	1650	-325	100.0	96.0	83.0	80.0	74.0	70.0	67.0	63.0	58.0	49.0	29.0	15.0	GC WITH SA
1057	08-09-91	5624.1	1650	-150	100.0	98.0	94.0	93.0	92.0	88.0	84.0	80.0	73.0	61.0			CL WITH SA
1063	08-10-91	5618.4	1780	-100	100.0	95.0	81.0	78.0	72.0	67.0	63.0	56.0	51.0	44.0	35.0	18.0	GC WITH SA
1072	08-12-91	5627.0	1700	-500	100.0	100.0	97.0	95.0	91.0	89.0	87.0	84.0	78.0	67.0	31.0	16.0	SA CL
1075	08-13-91	5625.2	1500	-245	100.0	95.0	85.0	83.0	78.0	74.0	71.0	68.0	64.0	56.0	31.0	15.0	GR CL WITH SA
1079	08-13-91	5624.9	1650	-250	100.0	96.0	91.0	87.0	81.0	77.0	73.0	69.0	64.0	54.0	32.0	13.0	SA CL WITH GR
1082	08-17-91	5627.5	1600	-300	100.0	100.0	100.0	99.0	98.0	97.0	95.0	94.0	89.0	75.0			CL WITH SA
1086	08-14-91	5624.4	1845	-86	100.0	95.0	92.0	92.0	91.0	90.0	89.0	86.0	79.0	68.0	33.0	16.0	SA CL
1089	08-17-91	5625.9	1450	-300	100.0	100.0	97.0	95.0	92.0	90.0	87.0	83.0	77.0	67.0			SA CL
1097	08-15-91	5628.3	1770	-335	100.0	100.0	94.0	93.0	88.0	85.0	82.0	78.0	73.0	65.0	37.0	20.0	SA CL WITH GR
1107	08-17-91	5624.8	1380	-220	100.0	91.0	90.0	90.0	89.0	88.0	87.0	85.0	78.0	68.0			SA CL
1110	08-19-91	5624.4	1335	-315	100.0	100.0	95.0	93.0	90.0	86.0	83.0	81.0	78.0	69.0	27.0	12.0	SA CL WITH GR
1121	08-20-91	5631.7	1725	-75	100.0	94.0	81.0	79.0	74.0	71.0	68.0	64.0	59.0	49.0			GC WITH SA
1123	08-20-91	5629.3	1835	-150	100.0	99.0	84.0	82.0	76.0	72.0	69.0	65.0	60.0	51.0	41.0	24.0	GR CL WITH SA
1132	08-21-91	5632.9	1700	-100	100.0	84.0	75.0	73.0	69.0	65.0	62.0	58.0	54.0	48.0	46.0	28.0	GC WITH SA & CB
1138	08-21-91	5632.9	1750	-400	100.0	100.0	98.0	96.0	92.0	90.0	86.0	81.0	75.0	65.0			SA CL
1142	08-23-91	5634.3	1780	-395	100.0	90.0	78.0	74.0	69.0	66.0	63.0	59.0	55.0	47.0	43.0	25.0	GC WITH SA & CB
1151	08-23-91	5635.3	1575	-100	100.0	100.0	80.0	76.0	69.0	64.0	60.0	54.0	50.0	44.0	42.0	24.0	GC WITH SA
1186	08-24-91	5635.8	1600	-395	100.0	100.0	96.0	95.0	92.0	90.0	87.0	83.0	79.0	69.0			SA CL
1190	08-30-91	5637.8	1925	-175	100.0	100.0	91.0	88.0	81.0	75.0	72.0	69.0	65.0	58.0			GR CL WITH SA
1192	08-30-91	5633.4	1725	-250	100.0	90.0	72.0	68.0	62.0	57.0	53.0	50.0	46.0	40.0	43.0	26.0	GC WITH SA & CB
1240	08-31-91	5636.7	1775	-375	100.0	99.0	91.0	89.0	86.0	84.0	81.0	78.0	74.0	68.0	48.0	30.0	SA CL WITH GR.
1241	08-31-91	5634.4	1350	-350	100.0	93.0	86.0	85.0	84.0	82.0	80.0	77.0	72.0	65.0			SA CL WITH GR
1247	09-01-91	5639.8	1550	-100	100.0	100.0	88.0	86.0	81.0	77.0	74.0	70.0	66.0	59.0	44.0	26.0	GR CL WITH SA
1254	08-31-91	5635.0	1945	-120	100.0	100.0	91.0	89.0	86.0	84.0	81.0	76.0	70.0	62.0			SA CL WITH GR
1257	09-03-91	5640.3	1660	-165	100.0	98.0	88.0	87.0	84.0	80.0	78.0	74.0	70.0	63.0	44.0	27.0	SA CL WITH GR
1260	09-04-91	5640.1	1500	-350	100.0	93.0	88.0	86.0	79.0	75.0	73.0	70.0	66.0	59.0			GR CL WITH SA
1268	09-04-91	5632.4	1950	-60	100.0	94.0	82.0	78.0	68.0	62.0	58.0	54.0	50.0	42.0			GC WITH SA & CB
1272	09-05-91	5641.6	1679	-225	100.0	98.0	93.0	92.0	90.0	88.0	86.0	82.0	77.0	70.0	47.0	31.0	SA CL
1277	09-06-91	5643.3	1550	-358	100.0	98.0	90.0	90.0	82.0	82.0	78.0	74.0	70.0	61.0	37.0	23.0	SA CL WITH GR
1298	09-13-91	5638.0	1977	-150	100.0	92.0	87.0	86.0	84.0	82.0	80.0	77.0	72.0	62.0	36.0	23.0	SA CL
1299	09-15-91	5640.4	1895	-194	100.0	100.0	98.0	97.0	94.0	93.0	91.0	88.0	83.0	71.0			SA CL
1302	09-16-91	5644.4	1800	-90	100.0	92.0	85.0	83.0	77.0	74.0	71.0	68.0	63.0	51.0			SA CL WITH GR

TEST NUMBER	DATE	ELEV	LOCATION STATION	OFFSET	GRADATION - PERCENT PASSING 8 IN	3 IN	1 IN	3/4 IN	3/8IN	# 4	# 10	# 40	#100	#200	LL	PI	CLASSIFICATION
1305	09-17-91	5638.2	2020	-61	100.0	100.0	97.0	96.0	90.0	90.0	88.0	84.0	77.0	67.0	32.0	18.0	CL WITH SA
1313	09-18-91	5645.7	1874	-173	100.0	98.0	95.0	94.0	90.0	86.0	82.0	70.0	56.0	42.0			SC
1315	09-18-91	5645.3	1500	-136	100.0	97.0	93.0	91.0	87.0	81.0	77.0	71.0	62.0	50.0	32.0	17.0	SA CL WITH GR
1325	09-21-91	5647.9	1637	-130	100.0	98.0	92.0	91.0	88.0	86.0	84.0	81.0	76.0	66.0			SA CL WITH GR
1326	09-21-91	5645.7	1646	-310	100.0	94.0	87.0	85.0	80.0	77.0	74.0	69.0	63.0	54.0	31.0	15.0	SA CL WITH GR
1331	09-22-91	5648.8	1515	-73	100.0	96.0	87.0	86.0	81.0	78.0	75.0	71.0	66.0	58.0			SA CL WITH GR
1333	09-22-91	5648.2	1472	-88	100.0	98.0	93.0	92.0	87.0	84.0	82.0	78.0	73.0	64.0	42.0	26.0	SA CL WITH GR
1336	09-22-91	5650.1	1953	-57	100.0	98.0	94.0	92.0	89.0	86.0	84.0	81.0	75.0	66.0			SA CL
1337	09-23-91	5648.3	1550	-200	100.0	99.0	98.0	98.0	97.0	96.0	95.0	92.0	88.0	77.0	36.0	16.0	CL WITH SA
1346	09-24-91	5652.0	1777	-91	100.0	100.0	98.0	97.0	95.0	94.0	92.0	90.0	83.0	71.0	41.0	24.0	CL WITH SA
1337A	09-24-91	5648.2	1540	-194	100.0	100.0	98.0	97.0	96.0	96.0	95.0	93.0	89.0	78.0			CL WITH SA
1348	09-25-91	5647.8	1542	-320	100.0	93.0	84.0	81.0	76.0	73.0	70.0	66.0	62.0	56.0			GR CL WITH SA
1352	09-25-91	5652.2	1525	-80	100.0	100.0	98.0	98.0	96.0	93.0	92.0	88.0	84.0	76.5	41.0	23.0	CL WITH SA
1361	09-28-91	5644.7	1450	-477	100.0	99.0	93.0	91.0	87.0	84.0	81.0	78.0	73.0	64.0	36.0	22.0	SA CL WITH GR
1364	09-29-91	5660.8	1698	-65	100.0	100.0	99.0	97.0	96.0	94.0	93.0	90.0	83.0	70.0			SA CL
1366	09-30-91	5656.2	1578	-65	100.0	100.0	97.0	95.0	94.0	92.0	90.0	87.0	80.0	70.0	34.0	21.0	SA CL
1369	09-30-91	5658.4	2158	-128	100.0	100.0	99.0	98.0	96.0	93.0	90.0	86.0	77.0	65.0			SA CL
1374	10-01-91	5656.5	1382	-66	100.0	97.0	89.0	88.0	85.0	83.0	81.0	78.0	73.0	63.0			SA CL WITH GR
1378	10-02-91	5657.8	1586	-343	100.0	98.0	94.0	93.0	88.0	85.0	83.0	80.0	75.0	66.0			SA CL
1390	10-03-91	5657.7	1519	-302	100.0	100.0	98.0	96.0	95.0	93.0	91.0	88.0	83.0	76.0	35.0	17.0	CL WITH SA
1397	10-04-91	5650.8	1453	-469	100.0	100.0	96.0	96.0	94.0	92.0	90.0	86.0	80.0	69.0			SA CL
1399	10-04-91	5659.7	1820	-109	100.0	100.0	93.0	90.0	86.0	83.0	80.0	77.0	73.0	64.0	27.0	12.0	SA CL WITH GR
1347	09-24-91	5658.2	1518	-176	100.0	100.0	99.0	98.0	96.0	95.0	94.0	92.0	88.0	79.2	33.0	16.0	CL WITH SA
1399A	10-06-91	5658.8	1820	-109	100.0	100.0	88.0	85.0	80.0	75.0	72.0	69.0	64.0	55.0			GR CL WITH SA
1412	10-07-91	5655.9	1535	-324	100.0	95.0	88.0	88.0	86.0	84.0	82.0	80.0	76.0	69.0			SA CL WITH GR
1418	10-08-91	5653.2	1782	-380	100.0	100.0	100.0	100.0	98.0	97.0	95.0	93.0	90.0	81.0	38.0	20.0	CL WITH SA
1421	10-08-91	5662.4	2143	-156	100.0	87.0	83.0	82.0	80.0	78.0	77.0	75.0	72.0	65.0			SA CL W CB & GR
1425	10-09-91	5661.8	1544	-44	100.0	91.0	84.0	80.0	75.0	72.0	70.0	65.0	58.0	49.0	33.0	18.0	SC WITH GR & CB
1427	10-09-91	5660.2	1397	-86	100.0	100.0	96.0	95.0	94.0	93.0	92.0	89.0	85.0	78.0			CL WITH SA
1451	10-10-91	5658.3	1693	-262	100.0	100.0	99.0	99.0	98.0	97.0	96.0	94.0	89.0	82.0	47.0	26.0	CL WITH SA
1461	10-13-91	5662.0	1980	-194	100.0	100.0	99.0	97.0	93.0	90.0	88.0	86.0	82.0	73.0	31.0	12.0	CL WITH SA
1466	10-14-91	5656.4	2042	-429	100.0	100.0	99.0	98.0	96.0	94.0	93.0	88.0	86.0	77.0			CL WITH SA
1473	10-16-91	5659.7	1881	-332	100.0	100.0	100.0	100.0	99.0	97.0	95.0	90.0	81.0	66.0	34.0	18.0	SA CL
1475	10-16-91	5664.5	1473	-119	100.0	100.0	97.0	96.0	92.0	91.0	90.0	88.0	84.0	77.0			CL WITH SA
1484	10-17-91	5663.5	2063	-116	100.0	94.0	86.0	84.0	79.0	77.0	75.0	72.0	68.0	60.0	37.0	21.0	SA CL WITH GR
1492	10-18-91	5664.7	1508	-260	100.0	100.0	97.0	96.0	95.0	92.0	91.0	88.0	84.0	76.0			CL WITH SA
1494	10-19-91	5666.2	1403	-140	100.0	99.0	90.0	88.0	84.0	79.0	75.0	71.0	65.0	57.0	34.0	19.0	SA CL WITH GR
1497	10-20-91	5668.2	1968	-126	100.0	100.0	96.0	95.0	89.0	85.0	83.0	80.0	76.0	68.0			SA CL WITH GR
1501	10-22-91	5667.5	1355	-114	100.0	100.0	100.0	99.0	99.0	98.0	97.0	95.0	92.0	86.0	40.0	25.0	CL
1508	10-22-91	5665.1	1980	-287	100.0	100.0	83.0	82.0	81.0	79.0	77.0	73.0	68.0	61.0			GR CL WITH SA
1558	04-01-92	5668.2	1918	-62	100.0	100.0	97.0	96.0	94.0	92.0	91.0	87.0	83.0	76.0	41.0	27.0	CL WITH SA
1564	04-03-92	5668.5	1960	-171	100.0	91.0	80.0	77.0	71.0	67.0	64.0	60.0	55.0	47.0			GC WITH SA & CB
1572	04-06-92	5667.9	1576	-130	100.0	99.0	96.0	95.0	90.0	87.0	85.0	81.0	76.0	68.0			SA CL
1575	04-07-92	5666.9	1458	-258	100.0	100.0	95.0	94.0	92.0	91.0	89.0	85.0	81.0	73.0			CL WITH SA
1572A	04-07-92	5667.9	1576	-130	100.0	99.0	96.0	95.0	90.0	87.0	85.0	81.0	76.0	68.0			SA CL
1587	04-09-92	5669.3	1675	-200	100.0	100.0	99.0	98.0	96.0	93.0	92.0	89.0	85.0	78.0			CL WITH SA
1601	04-10-92	5664.1	1519	-375	100.0	100.0	99.0	98.0	95.0	93.0	91.0	87.0	81.0	72.0			CL WITH SA
1603	04-11-92	5672.6	2040	-117	100.0	100.0	97.0	96.0	94.0	91.0	89.0	85.0	81.0	74.0	40.0	26.0	CL WITH SA
1607	04-13-92	5665.1	1966	-400	100.0	99.0	96.0	95.0	89.0	84.0	80.0	74.0	69.0	61.0			SA CL WITH GR
1610	04-14-92	5670.5	1834	-52	100.0	100.0	100.0	99.0	99.0	95.0	93.0	89.0	84.0	75.0			CL WITH SA
1640	04-25-92	5666.5	1846	-354	100.0	98.0	89.0	87.0	81.0	77.0	73.0	70.0	66.0	58.0			GR CL WITH SA
1642	04-26-92	5669.5	2112	-183	100.0	100.0	96.0	95.0	93.0	90.0	88.0	84.0	77.0	66.0	32.0	15.0	SA CL

QUALITY ACCEPTANCE TESTING - GRADATIONS REPORT REPORT NUMBER: RI.1

TEST NUMBER	DATE	ELEV	LOCATION		GRADATION - PERCENT PASSING										LL	PI	CLASSIFICATION
			STATION	OFFSET	8 IN	3 IN	1 IN	3/4IN	3/8IN	# 4	# 10	# 40	#100	#200			
1645	04-27-92	5675.3	1326	-262	100.0	100.0	93.0	91.0	86.0	81.0	78.0	75.0	71.0	63.0			GR CL WITH SA
1654	04-27-92	5670.7	1397	-91	100.0	100.0	96.0	93.0	87.0	82.0	79.0	75.0	69.0	60.0			SA CL WITH GR
1661	04-28-92	5671.0	2033	-250	100.0	100.0	96.0	94.0	90.0	88.0	86.0	82.0	78.0	70.0			SA CL
1663	04-29-92	5666.5	2146	-348	100.0	100.0	97.0	95.0	93.0	91.0	88.0	85.0	80.0	73.0			CL WITH SA
1645A	04-29-92	5667.4	1337	-271	100.0	100.0	93.0	91.0	86.0	81.0	78.0	75.0	71.0	63.0			GR CL WITH SA
1672	04-30-92	5673.7	1800	-139	100.0	100.0	99.0	98.0	95.0	93.0	91.0	88.0	84.0	76.0	44.0	23.0	CL WITH SA
1678	05-01-92	5667.8	1922	-300	100.0	100.0	99.0	98.0	95.0	93.0	91.0	87.0	83.0	74.0			CL WITH SA
1680	05-02-92	5673.0	2200	-61	100.0	100.0	97.0	97.0	95.0	93.0	90.0	87.0	82.0	73.0			CL WITH SA
1687	05-04-92	5673.3	1502	-197	100.0	100.0	99.0	99.0	96.0	94.0	93.0	90.0	87.0	78.0			CL WITH SA
1694	05-05-92	5672.5	1441	-288	100.0	100.0	97.0	95.0	92.0	90.0	88.0	85.0	80.0	71.0			CL WITH SA
1700	05-06-92	5677.3	1503	-113	100.0	100.0	95.0	93.0	90.0	86.0	83.0	78.0	72.0	64.0	41.0	25.0	SA CL
1702	05-07-92	5671.3	1584	-385	100.0	99.0	95.0	94.0	90.0	87.0	85.0	81.0	75.0	66.0			SA CL
1703	05-08-92	5680.9	1852	-61	100.0	100.0	97.0	95.0	94.0	92.0	90.0	87.0	84.0	78.0			CL WITH SA
1707	05-11-92	5673.1	1981	-345	100.0	98.0	90.0	88.0	86.0	83.0	81.0	77.0	71.0	65.0			SA CL WITH GR
1712	05-12-92	5680.3	1676	-128	100.0	100.0	97.0	96.0	90.0	88.0	85.0	80.0	75.0	65.0	27.0	12.0	SA CL
1715	05-12-92	5679.3	1828	-206	100.0	100.0	97.0	96.0	94.0	91.0	88.0	83.0	78.0	69.0			SA CL
1716	05-14-92	5683.7	1696	-228	100.0	100.0	96.0	94.0	92.0	89.0	87.0	84.0	80.0	73.0			CL WITH SA
1721	05-14-92	5677.1	1618	-296	100.0	100.0	97.0	96.0	94.0	92.0	90.0	88.0	85.0	78.0			CL WITH SA
1723	05-15-92	5676.7	1421	-332	100.0	100.0	96.0	94.0	90.0	88.0	85.0	82.0	77.0	69.0			SA CL
1726	05-16-92	5689.8	1716	-59	100.0	100.0	100.0	99.0	98.0	97.0	96.0	94.0	91.0	82.0	39.0	25.0	CL WITH SA
1728	05-16-92	5677.4	2040	-326	100.0	93.0	80.0	77.0	72.0	68.0	65.0	61.0	57.0	51.0			GR CL W/SA & CB
1730	05-16-92	5679.2	1809	-300	100.0	100.0	96.0	95.0	93.0	91.0	89.0	87.0	82.0	72.0			CL WITH SA
1732	05-17-92	5679.6	1882	-308	100.0	99.0	86.0	84.0	81.0	78.0	75.0	72.0	68.0	61.0			GR CL WITH SA
1734	05-17-92	5681.9	1452	-195	100.0	100.0	95.0	91.0	88.0	87.0	85.0	83.0	80.0	74.0			CL WITH SA
1736	05-18-92	5682.9	1662	-245	100.0	96.0	93.0	93.0	92.0	91.0	89.0	87.0	81.0	71.0	39.0	24.0	CL WITH SA
1742	05-19-92	5685.4	1550	-122	100.0	97.0	85.0	83.0	75.0	71.0	69.0	66.0	61.0	54.0			GR CL W/SA & CB
1750	05-27-92	5682.2	1313	-178	100.0	100.0	94.0	92.0	86.0	81.0	78.0	73.0	68.0	61.0			SA CL WITH GR
1752	05-27-92	5683.4	1828	-300	100.0	98.0	89.0	86.0	80.0	76.0	73.0	70.0	65.0	58.0			GR CL WITH SA
1756	05-27-92	5687.3	1569	-73	100.0	100.0	95.0	94.0	92.0	89.0	88.0	84.0	79.0	72.0			CL WITH SA
1759	05-28-92	5685.4	2114	-216	100.0	97.0	89.0	87.0	83.0	78.0	76.0	71.0	66.0	59.0	44.0	27.0	SA CL WITH GR
1762	05-28-92	5685.3	1577	-252	100.0	98.0	85.0	82.0	78.0	73.0	69.0	65.0	61.0	54.0			GR CL WITH SA
1764	05-29-92	5684.2	1383	-242	100.0	100.0	94.0	92.0	89.0	87.0	84.0	79.0	74.0	66.0			SA CL
1767	05-29-92	5687.1	1477	-114	100.0	100.0	97.0	96.0	93.0	91.0	89.0	88.0	84.0	77.0			CL WITH SA
1768	05-29-92	5687.5	2236	-75	100.0	100.0	90.0	86.0	82.0	78.0	75.0	72.0	68.0	61.0			GR CL WITH SA
1772	05-30-92	5687.9	1550	-200	100.0	100.0	96.0	94.0	93.0	90.0	87.0	84.0	80.0	72.0			CL WITH SA
1776	05-31-92	5690.4	2075	-112	100.0	98.0	91.0	87.0	84.0	78.0	75.0	70.0	65.0	58.0			GR CL WITH SA
1780	06-01-92	5690.5	1594	-94	100.0	98.0	94.0	92.0	87.0	85.0	82.0	78.0	72.0	62.0			SA CL
1782	06-01-92	5692.0	1790	-68	100.0	100.0	95.0	94.0	92.0	91.0	89.0	87.0	83.0	77.0			CL WITH SA
1786	06-02-92	5685.9	2200	-324	100.0	100.0	100.0	100.0	97.0	95.0	92.0	88.0	85.0	78.0	47.0	24.0	CL WITH SA
1787	06-02-92	5687.7	1279	-179	100.0	99.0	89.0	87.0	85.0	83.0	81.0	78.0	73.0	66.0			SA CL WITH GR
1791	06-02-92	5689.4	2253	-140	100.0	99.0	94.0	91.0	86.0	81.0	78.0	74.0	70.0	62.0			SA CL WITH GR
1792	06-03-92	5690.3	1446	-183	100.0	100.0	100.0	99.0	98.0	97.0	95.0	92.0	88.0	80.0			CL WITH SA
1796	06-03-92	5686.7	1890	-348	100.0	100.0	97.0	94.0	92.0	89.0	86.0	83.0	78.0	70.0			SA CL
1798	06-04-92	5691.0	1724	-271	100.0	92.0	77.0	73.0	68.0	62.0	57.0	52.0	47.0	40.0	32.0	15.0	GC WITH SA & CB
1803	06-05-92	5692.0	2260	-168	100.0	100.0	100.0	99.0	98.0	97.0	95.0	92.0	86.0	77.0			CL WITH SA
1817	06-08-92	5689.4	1471	-322	100.0	100.0	95.0	94.0	91.0	89.0	87.0	84.0	79.0	70.0			SA CL
1819	06-08-92	5695.4	1927	-75	100.0	99.0	95.0	94.0	91.0	89.0	86.0	83.0	78.0	72.0			CL WITH SA
1821	06-09-92	5692.3	2189	-200	100.0	100.0	99.0	98.0	95.0	94.0	94.0	91.0	88.0	82.0	42.0	26.0	CL WITH SA
1825	06-10-92	5693.1	1772	-275	100.0	100.0	100.0	99.0	98.0	97.0	96.0	93.0	90.0	82.0	43.0	26.0	CL WITH SA
1830	06-10-92	5694.2	1354	-66	100.0	99.0	94.0	93.0	90.0	88.0	86.0	83.0	79.0	72.0	45.0	29.0	CL WITH SA
1836	06-11-92	5695.3	2295	-162	100.0	98.0	93.0	91.0	86.0	82.0	79.0	76.0	72.0	66.0	49.0	34.0	SA CL WITH GR
1840	06-11-92	5693.7	1717	-300	100.0	96.0	96.0	83.0	77.0	70.0	65.0	60.0	53.0	45.0			GC WITH SA & CB

QUALITY ACCEPTANCE TESTING - GRADATIONS REPORT REPORT NUMBER: RI.1

TEST NUMBER	DATE	ELEV	LOCATION		GRADATION - PERCENT PASSING										LL	PI	CLASSIFICATION
			STATION	OFFSET	8 IN	3 IN	1 IN	3/4IN	3/8IN	# 4	# 10	# 40	#100	#200			
1847	06-12-92	5697.7	1545	-91	100.0	100.0	97.0	96.0	95.0	93.0	91.0	88.0	82.0	73.0			CL WITH SA
1850	06-13-92	5699.5	1650	-122	100.0	99.0	92.0	90.0	83.0	79.0	75.0	71.0	66.0	58.0	27.0	11.0	SA CL WITH GR
1852	06-18-92	5696.2	1918	-235	100.0	100.0	99.0	98.0	96.0	94.0	93.0	91.0	87.0	78.0			CL WITH SA
1854	06-18-92	5697.1	1403	-205	100.0	100.0	97.0	96.0	93.0	91.0	89.0	86.0	80.0	72.0	35.0	19.0	CL WITH SA
1856	06-19-92	5700.7	1851	-123	***94.0***	89.0	84.0	83.0	79.0	76.0	72.0	67.0	62.0	54.0			SA CL W/GR & CB
1862	06-19-92	5697.2	1932	-303	100.0	97.0	91.0	89.0	84.0	80.0	78.0	74.0	70.0	62.0	39.0	25.0	SA CL W/GR & CB
1866	06-20-92	5700.2	1454	-118	100.0	95.0	84.0	80.0	74.0	70.0	67.0	63.0	57.0	48.0	31.0	17.0	GC WITH SA & CB
1869	06-21-92	5696.7	1595	-331	100.0	94.0	85.0	82.0	77.0	73.0	70.0	67.0	62.0	53.0	33.0	19.0	GR CL W/SA & CB
1871	06-22-92	5698.4	1303	-230	100.0	100.0	94.0	91.0	88.0	85.0	82.0	77.0	71.0	61.0	31.0	16.0	SA CL WITH GR
1672	06-23-92	5701.8	1622	-225	100.0	97.0	90.0	88.0	83.0	81.0	79.0	76.0	71.0	64.0	39.0	21.0	SA CL W/GR & CB
1879	06-23-92	5698.7	2183	-308	100.0	96.0	88.0	85.0	80.0	76.0	72.0	67.0	59.0	48.0	31.0	13.0	SC WITH GR & CB
1881	06-23-92	5702.8	2093	-64	100.0	100.0	93.0	92.0	91.0	88.0	86.0	84.0	80.0	72.0	37.0	21.0	SA CL
1887	06-24-92	5704.0	1952	-169	100.0	96.0	87.0	85.0	81.0	78.0	75.0	72.0	67.0	60.0	42.0	26.0	SA CL W/GR & CB
1888	06-25-92	5703.3	1496	-200	100.0	96.0	88.0	85.0	81.0	77.0	74.0	71.0	65.0	57.0			SA CL W/GR & CB
1895	06-25-92	5706.3	1761	-60	100.0	100.0	94.0	92.0	90.0	86.0	84.0	81.0	76.0	68.0	42.0	26.0	SA CL WITH GR
1899	06-26-92	5701.6	1469	-311	100.0	98.0	90.0	88.0	81.0	77.0	74.0	70.0	65.0	58.0			GR CL W/SA & CB
1906	06-27-92	5708.0	1760	-70	100.0	98.0	90.0	88.0	83.0	78.0	76.0	72.0	66.0	59.0			GR CL WITH SA
1909	06-27-92	5705.9	2254	-69	100.0	99.0	97.0	96.0	94.0	91.0	88.0	84.0	77.0	68.0			SA CL
1912	06-28-92	5706.1	2109	-180	100.0	100.0	96.0	94.0	92.0	90.0	89.0	86.0	81.0	70.0			SA CL
1918	06-29-92	5705.6	1364	-127	100.0	100.0	95.0	93.0	90.0	88.0	85.0	82.0	76.0	66.0			SA CL
1921	06-29-92	5708.5	1670	-218	100.0	100.0	94.0	93.0	90.0	87.0	85.0	82.0	77.0	68.0			SA CL
1932	07-02-92	5709.8	1645	-300	100.0	100.0	96.0	95.0	94.0	91.0	89.0	86.0	81.0	73.0			CL WITH SA
1934	07-03-92	5710.5	1531	-65	100.0	95.0	90.0	89.0	88.0	87.0	85.0	84.0	78.0	73.0	45.0	30.0	CL WITH SA
1938	07-03-92	5708.1	2275	-205	***95.0***	93.0	88.0	87.0	83.0	80.0	77.0	73.0	68.0	60.0			SA CL W/GR & CB
1943	07-06-92	5710.5	2020	-213	100.0	100.0	99.0	98.0	96.0	95.0	94.0	91.0	85.0	75.0			CL WITH SA
1947	07-07-92	5713.2	1605	-87	100.0	98.0	91.0	89.0	84.0	80.0	78.0	74.0	70.0	63.0			SA CL W/GR & CB
1952	07-07-92	5709.6	2117	-271	100.0	97.0	83.0	80.0	74.0	71.0	67.0	64.0	59.0	50.0			GR CL W/SA & CB
1957	07-08-92	5714.5	1653	-271	100.0	99.0	90.0	86.0	86.0	83.0	80.0	77.0	73.0	65.0	42.0	29.0	SA CL WITH GR
1959	07-08-92	5712.2	2100	-163	100.0	100.0	93.0	90.0	87.0	83.0	79.0	75.0	70.0	61.0			SA CL WITH GR
1965	07-09-92	5715.3	1474	-163	100.0	100.0	96.0	95.0	94.0	93.0	92.0	89.0	86.0	78.0			CL WITH SA
1968	07-10-92	5717.6	1835	-127	100.0	100.0	97.0	97.0	93.0	91.0	90.0	87.0	83.0	75.0			CL WITH SA
1971	07-10-92	5712.7	2239	-264	100.0	100.0	98.0	97.0	94.0	91.0	88.0	83.0	78.0	69.0	41.0	27.0	SA CL
1974	07-11-92	5712.7	1235	-88	100.0	100.0	98.0	97.0	96.0	94.0	93.0	90.0	84.0	75.0			CL WITH SA
1978	07-15-92	5714.0	2281	-63	100.0	100.0	99.0	98.0	97.0	96.0	95.0	93.0	88.0	80.0			CL WITH SA
1980	07-15-92	5718.4	1550	-174	100.0	100.0	97.0	95.0	90.0	87.0	84.0	81.0	76.0	67.0			CL WITH SA
1985	07-16-92	5714.2	1240	-213	100.0	100.0	98.0	94.0	80.0	72.0	68.0	59.0	53.0	46.0			GC WITH SA
1988	07-16-92	5718.2	2035	-60	100.0	96.0	88.0	87.0	83.0	81.0	78.0	75.0	68.0	59.0	35.0	22.0	SA CL WITH GR
1989	07-17-92	5714.6	2302	-229	100.0	100.0	94.0	93.0	90.0	87.0	84.0	79.0	75.0	64.0			SA CL
1992	07-17-92	5719.6	2135	-77	100.0	100.0	94.0	93.0	89.0	86.0	84.0	81.0	74.0	64.0			SA CL
1994	07-18-92	5718.6	2350	-75	100.0	98.0	96.0	96.0	95.0	94.0	93.0	89.0	85.0	76.0			CL WITH SA
2003	07-18-92	5722.4	1848	-198	100.0	98.0	95.0	94.0	93.0	91.0	90.0	87.0	83.0	75.0			CL WITH SA
2005	07-19-92	5709.4	1200	-359	100.0	99.0	95.0	93.0	87.0	82.0	77.0	70.0	62.0	51.0	33.0	18.0	SA CL WITH GR
2008	07-20-92	5721.0	1540	-246	***94.0***	91.0	83.0	81.0	78.0	75.0	72.0	67.0	60.0	50.0			SA CL W/GR & CB
2010	07-20-92	5722.2	1619	-250	100.0	100.0	98.0	96.0	94.0	91.0	87.0	84.0	78.0	68.0			SA CL
2014	07-20-92	5724.1	1759	-50	100.0	100.0	95.0	94.0	91.0	88.0	86.0	83.0	79.0	69.0			SA CL
2017	07-21-92	5719.7	2214	-164	100.0	100.0	96.0	95.0	94.0	92.0	90.0	87.0	83.0	73.0			CL WITH SA
2021	07-21-92	5720.0	1294	-209	100.0	100.0	97.0	96.0	94.0	93.0	92.0	90.0	86.0	77.0	43.0	27.0	CL WITH SA
2027	07-22-92	5724.1	1412	-153	100.0	100.0	96.0	94.0	91.0	89.0	88.0	84.0	77.0	66.0			SA CL
2032	07-23-92	5724.5	1758	-250	100.0	94.0	82.0	80.0	76.0	72.0	69.0	65.0	60.0	52.0			GR CL W/SA & CB
2037	07-24-92	5722.8	2050	-253	100.0	99.0	92.0	91.0	87.0	83.0	79.0	74.0	68.0	56.0			SA CL WITH GR
2040	07-24-92	5727.4	1389	-99	100.0	97.0	90.0	88.0	83.0	81.0	79.0	75.0	69.0	58.0	38.0	23.0	SA CL
2044	07-27-92	5728.2	1688	-159	100.0	100.0	97.0	95.0	92.0	89.0	87.0	84.0	79.0	67.0			SA CL

TEST NUMBER	DATE	ELEV	LOCATION		GRADATION - PERCENT PASSING										LL	PI	CLASSIFICATION
			STATION	OFFSET	8 IN	3 IN	1 IN	3/4IN	3/8IN	# 4	# 10	# 40	#100	#200			
2046	07-27-92	5725.4	2103	-88	100.0	96.0	88.0	87.0	85.0	83.0	81.0	78.0	73.0	64.0			SA CL WITH GR
2056	07-28-92	5727.6	1261	-235	100.0	99.0	94.0	91.0	89.0	86.0	82.0	78.0	73.0	61.0			SA CL
2058	07-29-92	5727.8	1963	-50	100.0	87.0	83.0	82.0	80.0	78.0	76.0	74.0	70.0	61.0			SA CL W/CB & GR
2061	07-29-92	5728.6	2034	-128	100.0	100.0	97.0	96.0	94.0	92.0	90.0	88.0	83.0	74.0			CL WITH SA
2065	07-30-92	5731.5	1365	-88	100.0	100.0	98.0	97.0	93.0	90.0	88.0	85.0	82.0	74.0	37.0	23.0	CL WITH SA
2071	07-30-92	5732.7	1692	-125	100.0	100.0	95.0	94.0	91.0	89.0	87.0	83.0	79.0	71.0			CL WITH SA
2077	07-30-92	5730.4	2039	-170	100.0	98.0	96.0	95.0	94.0	92.0	90.0	85.0	81.0	74.0			CL WITH SA
2079	07-31-92	5733.1	1748	-131	100.0	100.0	98.0	97.0	96.0	94.0	93.0	92.0	86.0	73.0	25.0	8.0	CL WITH SA
2082	07-31-92	5732.5	1532	-51	100.0	100.0	97.0	95.0	91.0	88.0	86.0	83.0	79.0	69.0			SA CL
2084	07-31-92	5731.6	2084	-195	100.0	99.0	93.0	92.0	86.0	83.0	81.0	77.0	72.0	63.0			SA CL WITH GR
2087	08-01-92	5736.0	1418	-197	100.0	100.0	98.0	97.0	95.0	94.0	93.0	90.0	85.0	74.0	37.0	23.0	CL WITH SA
2101	08-03-92	5731.4	2164	-212	100.0	95.0	87.0	84.0	81.0	79.0	77.0	74.0	68.0	52.0			SA CL W/GR & CB
2102	08-03-92	5734.7	1836	-61	100.0	99.0	94.0	91.0	86.0	82.0	79.0	76.0	70.0	62.0			SA CL WITH GR
2107	08-04-92	5733.9	1891	-226	100.0	100.0	99.0	98.0	98.0	96.0	95.0	92.0	88.0	79.0	30.0	15.0	CL WITH SA
2110	08-04-92	5731.1	2330	-145	100.0	100.0	98.0	98.0	96.0	95.0	94.0	91.0	88.0	80.0			CL WITH SA
2113	08-05-92	5732.6	1229	-64	100.0	98.0	93.0	91.0	89.0	86.0	83.0	78.0	69.0	55.0			SA CL WITH GR
2116	08-05-92	5738.2	1627	-209	100.0	98.0	93.0	91.0	86.0	83.0	81.0	79.0	75.0	67.0	42.0	23.0	SA CL WITH GR
2119	08-06-92	5730.1	2446	-77	100.0	98.0	91.0	90.0	87.0	85.0	83.0	81.0	77.0	68.0			SA CL WITH GR
2124	08-07-92	5732.7	1204	-59	100.0	99.0	92.0	90.0	86.0	83.0	81.0	78.0	74.0	64.0			SA CL WITH GR
2125	08-07-92	5739.6	1801	-51	100.0	100.0	98.0	97.0	95.0	92.0	90.0	88.0	84.0	73.0	46.0	32.0	CL WITH SA
2131	08-10-92	5743.3	1550	-140	100.0	96.0	94.0	93.0	93.0	92.0	91.0	88.0	82.0	71.0			CL WITH SA
2132	08-10-92	5744.4	1575	-191	100.0	99.0	96.0	96.0	94.0	91.0	89.0	86.0	82.0	72.0			CL WITH SA
2140	08-11-92	5733.3	2496	-56	100.0	100.0	96.0	94.0	92.0	90.0	88.0	85.0	75.0	64.0			SA CL
2144	08-12-92	5740.7	1260	-94	100.0	100.0	99.0	98.0	96.0	93.0	91.0	87.0	81.0	70.0			CL WITH SA
2155	08-13-92	5743.7	1519	-62	100.0	95.0	84.0	82.0	76.0	73.0	70.0	67.0	69.0	50.0			SA CL W/GR & CB
2157	08-13-92	5743.0	2157	-198	100.0	100.0	96.0	95.0	91.0	89.0	87.0	83.0	78.0	68.0	39.0	24.0	SA CL
2176	08-14-92	5747.3	1397	-121	100.0	100.0	96.0	95.0	93.0	90.0	88.0	85.0	76.0	64.0			SA CL
2180	08-15-92	5745.3	1976	-49	100.0	93.0	81.0	77.0	70.0	66.0	63.0	59.0	54.0	45.0	33.0	17.0	GC WITH SA & CB
2182	08-15-92	5749.4	1510	-147	100.0	99.0	88.0	85.0	81.0	77.0	74.0	71.0	63.0	53.0			SA CL WITH GR
2189	08-17-92	5748.2	1557	-78	100.0	97.0	91.0	89.0	86.0	84.0	81.0	77.0	69.0	59.0			SA CL WITH GR
2193	08-18-92	5744.4	2405	-140	100.0	100.0	99.0	99.0	99.0	98.0	98.0	96.0	91.0	79.0	39.0	22.0	CL WITH SA
2197	08-18-92	5749.2	1784	-143	100.0	100.0	99.0	99.0	98.0	97.0	96.0	95.0	94.0	90.0			CL
2199	08-19-92	5748.9	1305	-119	100.0	100.0	99.0	99.0	98.0	97.0	96.0	94.0	87.0	72.0			CL WITH SA
2200	08-19-92	5748.8	2206	-93	100.0	100.0	99.0	98.0	95.0	92.0	88.0	82.0	72.0	58.0	33.0	19.0	SA CL
2203	08-19-92	5746.8	2497	-176	100.0	98.0	93.0	92.0	89.0	87.0	84.0	80.0	75.0	64.6			SA CL WITH GR
2205	08-20-92	5748.9	1240	-183	100.0	100.0	98.0	97.0	96.0	95.0	94.0	92.0	85.0	73.8			CL WITH SA
2209	08-21-92	5753.9	1749	-43	100.0	100.0	97.0	96.0	94.0	92.0	90.0	87.0	83.0	74.0	44.0	29.0	CL WITH SA
2218	08-23-92	5753.4	1359	-64	100.0	100.0	100.0	99.5	99.0	97.0	95.0	91.0	86.0	74.1			CL WITH SA
2222	08-24-92	5752.3	2147	-177	100.0	100.0	99.8	99.7	99.7	98.3	97.0	92.0	89.0	82.1	55.0	37.0	CH WITH SA
2224	08-25-92	5751.6	2247	-153	100.0	100.0	98.0	97.0	95.0	92.0	90.0	85.0	77.0	61.0			SA CL
2228	08-26-92	5757.3	1503	-47	100.0	100.0	92.0	89.0	82.0	71.0	61.0	50.0	36.0	25.0	29.0	14.0	SC WITH GR
2229	08-26-92	5757.1	1486	-110	100.0	100.0	96.0	95.0	89.0	82.0	76.0	70.0	62.0	54.0			SA CL WITH GR
2232	08-26-92	5755.9	2229	-110	100.0	100.0	96.0	95.0	90.0	87.0	85.0	82.0	76.0	63.0	38.0	25.0	SA CL
2235	08-27-92	5755.7	2534	-62	95.0	84.0	77.0	75.0	70.0	67.0	63.0	58.0	49.0	38.0			SC WITH GR & CB
2242	08-28-92	5759.0	1208	-67	100.0	94.0	86.0	84.0	79.0	77.0	73.0	69.0	58.0	44.0			SC WITH GR & CB
2251	08-29-92	5758.2	2056	-56	100.0	99.0	94.0	90.0	85.0	79.0	74.0	66.0	56.0	45.0			SC WITH GR
2252	08-29-92	5759.9	1914	-139	100.0	100.0	95.0	93.0	91.0	89.0	88.0	85.0	79.0	68.0			SA CL
2255	08-30-92	5763.2	1592	-85	100.0	100.0	98.0	97.0	93.0	89.0	85.0	80.0	67.0	54.0			SA CL
2258	08-30-92	5763.1	1396	-137	100.0	100.0	100.0	100.0	94.0	92.0	91.0	88.0	78.0	67.0			SA CL
2261	09-01-92	5760.0	2338	-71	100.0	100.0	97.0	97.0	95.0	94.0	93.0	91.0	86.0	76.0	33.0	14.0	CL WITH SA
2262	09-01-92	5763.8	1334	-88	100.0	100.0	96.0	95.0	95.0	94.0	94.0	92.0	86.0	73.0			CL WITH SA
2275	09-03-92	5764.7	1413	-45	100.0	97.0	90.0	88.0	84.0	81.0	77.0	72.0	66.0	55.0	30.0	16.0	SA CL W/GR & CB

TEST NUMBER	DATE	ELEV	LOCATION		GRADATION - PERCENT PASSING										LL	PI	CLASSIFICATION
			STATION	OFFSET	8 IN	3 IN	1 IN	3/4IN	3/8IN	# 4	# 10	# 40	#100	#200			
2279	09-08-92	5767.5	1519	-59	100.0	100.0	97.0	96.0	93.0	91.0	88.0	86.0	82.0	74.0			CL WITH SA
2280	09-09-92	5762.7	2505	-85	100.0	98.0	96.0	95.0	92.0	89.0	86.0	83.0	77.0	66.0			SA CL
2288	09-10-92	5767.2	2518	-39	100.0	100.0	89.0	86.0	77.0	73.0	70.0	67.0	58.0	49.0			GC WITH SA
2292	09-10-92	5767.3	1758	-111	100.0	100.0	93.0	91.0	87.0	85.0	82.0	80.0	76.0	66.0			SA CL WITH GR
2294	09-11-92	5766.9	2482	-110	100.0	100.0	98.0	97.0	95.0	93.0	91.0	90.0	86.0	77.0	44.0	27.0	CL WITH SA
2301	09-12-92	5770.3	2583	-91	100.0	98.0	94.0	94.0	91.0	89.0	87.0	84.0	80.0	69.0			SA CL
2302	09-12-92	5772.1	2071	-49	100.0	100.0	95.0	94.0	89.0	86.0	84.0	81.0	77.0	70.0	50.0	32.0	SA CH
2305	09-13-92	5774.5	1541	-44	100.0	95.0	84.0	81.0	75.0	72.0	70.0	67.0	61.0	49.0			SC WITH GR & CB
2307	09-13-92	5774.9	1815	-66	100.0	97.0	87.0	85.0	82.0	79.0	76.0	73.0	69.0	62.0			GR CL W/SA & CB
2310	09-13-92	5775.0	1800	-77	100.0	99.0	91.0	90.0	89.0	88.0	86.0	84.0	78.0	64.0	29.0	12.0	SA CL
2313	09-14-92	5775.2	1376	-72	100.0	100.0	98.0	98.0	94.0	93.0	91.0	89.0	82.0	68.0			SA CL
2316	09-15-92	5775.8	1161	-89	100.0	100.0	93.0	89.0	84.0	80.0	77.0	74.0	69.0	59.0			SA CL WITH GR
2320	09-16-92	5778.6	2092	-72	100.0	100.0	97.0	95.0	90.0	87.0	84.0	81.0	76.0	68.0			CL WITH SA
2322	09-16-92	5780.1	2155	-49	100.0	100.0	95.0	93.0	88.0	85.0	82.0	80.0	76.0	68.0			SA CL WITH GR
2330	09-17-92	5779.4	1230	-86	100.0	100.0	90.0	89.0	85.0	83.0	80.0	76.0	70.0	59.0	42.0	28.0	SA CL WITH GR
2333	09-18-92	5776.9	2577	-61	100.0	100.0	98.0	98.0	97.0	95.0	94.0	93.0	88.0	76.0			CL WITH SA
2334	09-18-92	5783.1	1402	-73	100.0	100.0	95.0	94.0	91.0	89.0	87.0	84.0	78.0	65.0			SA CL
2339	09-18-92	5777.5	2573	-58	100.0	98.0	87.0	86.0	83.0	80.0	77.0	72.0	65.0	55.0			SA CL WITH GR
2350	09-22-92	5785.0	2631	-68	100.0	93.0	80.0	77.0	69.0	64.0	60.0	56.0	52.0	46.0			GC WITH SA & CB
2351	09-22-92	5790.3	2252	-41	100.0	92.0	77.0	74.0	65.0	60.0	56.0	52.0	48.0	42.0			GC WITH SA & CB
2355	09-22-92	5798.8	1796	-35	100.0	99.0	85.0	80.0	69.0	63.0	59.0	54.0	50.0	43.0	39.0	24.0	GC WITH SA
2358	09-23-92	5788.9	2502	-48	100.0	97.0	88.0	85.0	79.0	75.0	72.0	68.0	64.0	55.0			GR CL WITH SA
2362	09-25-92	5788.3	2650	-50	100.0	93.0	74.0	68.0	60.0	53.0	47.0	42.0	38.0	31.0			GC WITH SA & CB
2370	09-25-92	5796.4	1171	-43	100.0	100.0	94.0	93.0	91.0	89.0	88.0	85.0	79.0	68.0	41.0	24.0	SA CL
2372	09-26-92	5792.8	2610	-42	100.0	77.0	62.0	58.0	50.0	45.0	42.0	35.0	28.0	21.0			GC WITH SA & CB
2381	09-30-92	5804.0	1475	-22	100.0	94.0	86.0	78.0	57.0	46.0	42.0	36.0	30.0	23.0			GC WITH SA & CB
2384	10-02-92	5804.7	2485	-23	***98.0***	76.0	58.0	54.0	47.0	43.0	39.0	35.0	29.0	23.0			GC WITH CB & SA

NOTE - Emphasized Numbers indicate percent passing outside of gradation range specified.

COMMENT: THIS REPORT COVERS THE ENTIRE CONSTRUCTION OF THE DAM.

LAB CHIEF: ______________________ SUBMITTED BY: ______________________
PROJECT ENGINEER

PROJECT: LITTLE DELL LAKE, DAM AND APPURTENANCES RIVER: SALT LAKE CITY STREAMS STATE: UTAH TOWN: SALT LAKE CITY	CONTRACT NO. DACW05-89-C-0045 CONTRACTOR: CLEMENT BROTHERS AND J.E. STARNES CO.	DATE OF REPORT: 12-07-92 01-01-90 THRU 12-31-92

EMBANKMENT ZONE	MIN. DESIGNED % COMP	SPEC. W.C. % RANGE	LOOSE LIFT THICK. (IN)	NUMBER OF PASSES	COMPACTION EQUIPMENT
RANDOM I	95	-3 TO 1	8	6	CAT 825C, SP-60

TEST NUMBER	DATE	ELEV	LOCATION		FIELD		STANDARD LAB COMPACTION			PERCENT COMPACTION	PERCENT +- OMC	CLASSIFICATION
			STATION	OFFSET	DRY DENS (PCF)	MC %	TEST METH	MX DRY DEN	OMC %			
581	10-28-90	5585.0	1520	-100	112.1	13.6	5/581 6	108.2	16.6	103.6	-3.0	CL WITH SA
781	06-18-91	5584.6	1500	-200	102.6	13.7	5/781 6	109.6	17.5	***93.6***	***-3.8***	SA CL
786	06-19-91	5583.6	1585	-315	115.7	15.7	5/786 6	112.0	16.3	103.3	-0.6	SA CL WITH GR
790	06-20-91	5581.9	1550	-305	115.4	13.0	5/790 6	108.1	18.1	106.8	***-5.1***	SA CL
793	06-21-91	5587.6	1600	-250	111.0	15.0	4/793 6	113.4	15.6	97.9	-0.6	SA CL
796	06-21-91	5589.2	1550	-200	113.0	13.0	5/796 6	107.8	17.4	104.8	***-4.4***	CL WITH SA
802	06-24-91	5588.2	1465	-250	112.0	15.9	5/802 6	108.5	16.9	103.2	-1.0	SA CL
804	06-24-91	5589.6	1625	-325	102.7	16.6	5/804 6	110.5	16.4	***92.9***	0.2	SA CL
808	06-25-91	5590.7	1550	-250	104.5	16.6	5/808 6	102.5	20.5	102.0	***-3.9***	SA CH
811	06-25-91	5574.3	1500	-505	110.4	15.0	5/811 6	109.1	17.1	101.2	-2.1	SA CL
812	06-26-91	5576.8	1500	-500	113.2	15.6	3/812 6	108.6	17.3	104.2	-1.7	CL WITH SA
823	06-27-91	5583.4	1450	-375	113.9	14.9	5/823 6	111.8	16.7	101.9	-1.8	SA CL
829	06-28-91	5580.2	1525	-550	108.0	18.4	4/829 6	110.9	16.6	97.4	***1.8***	SA CL
833	06-29-91	5572.8	1400	-625	114.9	17.3	H/793	113.4	15.6	101.3	***1.7***	CL WITH SA
834	06-28-91	5571.6	1475	-642	105.1	15.1	3/834 6	111.4	15.9	***94.3***	-0.8	SA CL
843	06-29-91	5587.3	1650	-200	112.5	15.8	H/793	113.4	15.6	99.2	0.2	SA CL
848	07-01-91	5584.1	1500	-550	113.3	17.3	5/848 6	110.0	16.9	103.0	0.4	CL WITH SA
850	07-01-91	5589.9	1550	-350	113.2	15.4	5/850 6	113.5	15.0	99.7	0.4	SA CL
853	07-02-91	5586.6	1350	-400	113.2	15.9	3/853 6	114.2	14.8	99.1	***1.1***	SA CL
859	07-02-91	5588.9	1500	-450	113.3	14.0	3/859 6	112.2	16.0	101.0	-2.0	SA CL
860	07-03-91	5590.0	1500	-500	104.3	17.3	5/860 6	108.6	17.3	96.0	0.0	SA CL
861	07-03-91	5593.6	1730	-400	118.3	14.7	4/861 6	111.8	14.7	105.8	0.0	CL WITH SA
862	07-03-91	5593.1	1600	-250	110.1	14.4	4/862 6	111.2	16.6	99.0	-2.2	CL WITH SA
863	07-04-91	5593.1	1400	-150	114.2	15.8	H/848	110.0	16.9	103.8	-1.1	SA CL
864	07-04-91	5589.9	1400	-400	111.1	16.6	5/864 6	109.3	17.0	101.6	-0.4	SA CL
865	07-05-91	5589.7	1400	-375	115.1	16.2	H/804	110.5	16.4	104.2	-0.2	SA CL
868	07-05-91	5594.6	1575	-250	109.8	16.7	5/868 6	110.1	16.9	99.7	-0.2	CL WITH SA
875	07-09-91	5590.4	1425	-475	103.6	20.0	4/875 6	103.4	18.9	100.2	***1.1***	CH WITH SA
876	07-09-91	5595.3	1550	-350	106.0	17.9	5/876 6	115.4	13.9	***91.9***	***4.0***	SA CL WITH GR
882	07-15-91	5595.3	1475	-275	113.8	15.4	5/882 6	107.5	18.0	105.9	-2.6	SA CL
892	07-10-91	5574.7	1400	-725	109.1	13.8	5/892 6	108.4	14.4	100.6	-0.6	CL WITH SA
894	07-10-91	5585.0	1517	-550	109.6	14.2	4/894 6	109.6	16.0	100.0	-1.8	CL WITH SA
897	07-12-91	5577.8	1475	-750	101.0	16.3	5/897 6	108.7	17.5	***92.9***	-1.2	CL WITH SA
900	07-12-91	5588.0	1450	-700	113.3	15.3	3/900 6	109.6	15.8	103.4	-0.5	CL
901	07-13-91	5582.6	1450	-720	112.1	17.0	5/901 6	106.2	18.7	105.6	-1.7	CL WITH SA
903	07-15-91	5595.0	1475	-400	117.9	13.1	3/903 6	111.7	15.8	105.6	-2.7	SC WITH GR
910	07-16-91	5593.7	1400	-550	105.9	16.7	5/910 6	107.7	18.1	98.3	-1.4	CL WITH SA
912	07-15-91	5598.5	1600	-375	110.7	15.2	H/804	110.5	16.4	100.2	-1.2	SA CL
915	07-17-91	5591.4	1375	-650	110.8	16.0	5/915 6	107.6	17.3	103.0	-1.3	CL
929	07-17-91	5598.7	1550	-520	106.6	18.9	H/882	107.5	18.0	99.2	0.9	SA CL
930	07-18-91	5600.0	1450	-400	103.4	17.2	5/930 6	99.9	21.6	103.5	***-4.4***	CH WITH SA
934	07-18-91	5597.3	1490	-105	118.8	12.2	3/934 6	117.6	13.5	101.0	-1.3	SA CL
938	07-22-91	5604.4	1625	-450.	107.7	18.2	H/868	106.7	19.0	100.9	-0.8	SA CL

QUALITY ACCEPTANCE TESTING - COMPACTION REPORT   REPORT NUMBER: RI.2

TEST NUMBER	DATE	ELEV	LOCATION STATION	LOCATION OFFSET	FIELD DRY DENS (PCF)	FIELD MC %	STANDARD LAB COMPACTION TEST METH	STANDARD LAB COMPACTION MX DRY DEN	STANDARD LAB COMPACTION OMC %	PERCENT COMPACTION	PERCENT +- OMC	CLASSIFICATION
939	07-23-91	5600.5	1525	-140	107.5	13.6	H/786	112.0	16.3	96.0	-2.7	SA CL WITH GR
947	07-23-91	5602.4	1400	-250	108.6	18.4	5/947 6	108.0	17.6	100.6	0.8	CL WITH SA
950	07-24-91	5600.5	1450	-550	114.1	16.3	3/950 6	109.4	17.0	104.3	-0.7	GC WITH SA
956	07-24-91	5600.8	1440	-480	108.9	17.4	5/956 6	105.3	17.9	103.4	-0.5	SA CL
957	07-25-91	5603.9	1600	-150	106.9	17.8	5/957 6	109.2	17.4	97.9	0.4	SA CL WITH GR
963	07-26-91	5603.5	1590	-600	105.5	15.6	5/963 6	103.3	20.0	102.1	**-4.4**	SA CL WITH GR
969	07-26-91	5602.2	1450	-150	104.2	17.4	4/969 6	106.2	17.0	98.1	0.4	SA CL
981	07-29-91	5609.9	1675	-200	108.8	16.5	4/981 6	112.0	13.8	97.1	**2.7**	GR CL WITH SA
983	07-30-91	5608.2	1440	-400	111.1	16.0	5/983 6	105.4	18.2	105.4	-2.2	GR CL WITH SA
992	08-01-91	5610.0	1600	-550	113.5	14.3	5/992 6	110.3	16.0	102.9	-1.7	SA CL WITH GR
1000	08-01-91	5611.4	1450	-450	110.5	16.6	5/1000 6	107.1	17.8	103.2	-1.2	GR CL WITH SA
1004	08-02-91	5617.1	1700	-400	114.1	15.7	5/1004 6	107.0	17.8	106.6	-2.1	CL WITH SA
1011	08-03-91	5611.2	1400	-340	114.9	14.5	4/1011 6	115.9	12.0	99.1	**2.5**	GC WITH SA
1015	08-05-91	5618.7	1725	-450	117.1	13.9	4/1015 6	109.4	15.4	107.0	-1.5	GR CL WITH SA
1021	08-06-91	5620.1	1550	-475	114.8	14.0	H/992	110.3	16.0	104.1	-2.0	SA CL WITH GR
1022	08-06-91	5616.2	1700	-250	117.2	12.5	5/1022 6	116.4	12.9	100.7	-0.4	GC WITH SA
1031	08-07-91	5615.5	1425	-300	106.1	18.2	5/1031 6	101.1	21.2	104.9	-3.0	CL WITH SA.
1042	08-08-91	5622.1	1560	-195	109.0	15.5	4/1042 6	113.6	14.3	96.0	1.2	GC WITH SA
1048	08-09-91	5619.7	1450	-150	113.2	10.0	5/1048 6	120.1	11.3	**94.3**	-1.3	GC WITH SA
1053	08-10-91	5624.6	1650	-325	118.2	11.2	5/1053 6	119.7	11.2	98.7	0.0	GC WITH SA
1057	08-09-91	5624.1	1650	-150	116.7	12.6	5/1057 6	115.4	13.6	101.1	-1.0	CL WITH SA
1063	08-10-91	5618.4	1780	-100	115.4	11.4	H/1011	115.9	12.0	99.6	-0.6	GC WITH SA
1072	08-12-91	5627.0	1700	-500	114.4	13.2	2/1072 6	107.5	17.9	106.4	**-4.7**	SA CL
1075	08-13-91	5625.2	1500	-245	115.3	12.8	5/1075 6	119.3	12.9	96.6	-0.1	GR CL WITH SA
1079	08-13-91	5624.9	1650	-250	115.2	12.9	5/1079 6	115.2	13.6	100.0	-0.7	SA CL WITH GR
1082	08-17-91	5627.5	1600	-300	112.2	15.6	5/1082 6	115.8	14.9	96.9	0.7	CL WITH SA
1086	08-14-91	5624.4	1845	-86	112.5	14.5	5/1086 6	111.8	16.0	100.6	-1.5	SA CL
1089	08-17-91	5625.9	1450	-300	120.4	13.5	5/1089 6	110.2	16.6	109.3	**-3.1**	SA CL
1097	08-15-91	5628.3	1770	-335	122.0	12.1	2/1097 6	110.0	16.1	110.9	**-4.0**	SA CL WITH GR
1107	08-17-91	5624.8	1380	-220	118.8	14.0	4/1107 6	111.6	16.2	106.5	-2.2	SA CL
1110	08-19-91	5624.4	1335	-315	112.6	16.6	4/1110 6	117.1	14.0	96.2	**2.6**	SA CL WITH GR
1121	08-20-91	5631.7	1725	-75	108.9	9.7	4/1121 6	117.6	12.2	**92.6**	-2.5	GC WITH SA
1123	08-20-91	5629.3	1835	-150	115.3	14.4	4/1123 6	111.3	14.0	103.6	0.4	GR CL WITH SA
1132	08-21-91	5632.9	1700	-100	113.4	14.0	4/1132 6	106.6	17.6	106.4	**-3.6**	GC WITH SA & CB
1138	08-21-91	5632.9	1750	-400	113.1	14.9	4/1138 6	107.9	16.8	104.8	-1.9	SA CL
1142	08-23-91	5634.3	1780	-395	115.2	14.7	4/1142 6	108.6	15.5	106.1	-0.8	GC WITH SA & CB
1151	08-23-91	5635.3	1575	-100	108.4	16.1	4/1151 6	113.5	14.1	95.5	2.0	GC WITH SA
1186	08-24-91	5635.8	1600	-395	105.5	16.2	4/1186 6	105.2	19.2	100.3	-3.0	SA CL
1190	08-30-91	5637.8	1925	-175	111.3	12.3	4/1190 6	111.8	14.8	99.6	-2.5	GR CL WITH SA
1192	08-30-91	5633.4	1725	-250	119.3	10.6	H/1044	116.0	12.8	102.8	-2.2	GC WITH SA & CB
1240	08-31-91	5636.7	1775	-375	108.3	17.3	4/1240 6	105.0	19.0	103.1	-1.7	SA CL WITH GR.
1241	08-31-91	5634.4	1350	-350	107.3	18.6	3/1241 6	104.8	19.3	102.4	-0.7	SA CL WITH GR
1247	09-01-91	5639.8	1550	-100	113.7	15.7	5/1247 6	106.4	17.6	106.9	-1.9	GR CL WITH SA
1254	08-31-91	5635.0	1945	-120	114.0	14.9	4/1254 6	107.3	18.2	106.2	**-3.3**	SA CL WITH GR
1257	09-03-91	5640.3	1660	-165	115.7	14.5	4/1257 6	113.0	13.9	102.4	0.6	SA CL WITH GR
1260	09-04-91	5640.1	1500	-350	101.4	22.4	4/1260 6	103.3	19.0	98.2	**3.4**	GR CL WITH SA
1268	09-04-91	5632.4	1950	-60	121.1	12.1	4/1268	114.8	13.3	105.5	-1.2	GC WITH SA & CB
1272	09-05-91	5641.6	1679	-225	110.0	16.5	4/1272 6	102.6	19.4	107.2	-2.9	SA CL
1277	09-06-91	5643.3	1550	-358	111.5	13.0	4/1277 6	109.3	15.3	102.0	-2.3	SA CL WITH GR
1298	09-13-91	5638.0	1977	-150	113.2	14.2	4/1298 6	110.6	15.7	102.4	-1.5	SA CL
1299	09-15-91	5640.4	1895	-194	114.4	13.9	4/1299 6	108.6	16.2	105.3	-2.3	SA CL
1302	09-16-91	5644.4	1800	-90	109.8	11.5	4/1302 6	113.2	14.0	97.0	-2.5	SA CL WITH GR

QUALITY ACCEPTANCE TESTING - COMPACTION REPORT

REPORT NUMBER: RI.2

TEST NUMBER	DATE	ELEV	LOCATION		FIELD		STANDARD LAB COMPACTION			PERCENT COMPACTION	PERCENT +- OMC	CLASSIFICATION
			STATION	OFFSET	DRY DENS (PCF)	MC %	TEST METH	MX DRY DEN	OMC %			
1305	09-17-91	5638.2	2020	-61	114.7	13.6	4/1305 6	113.8	14.9	100.8	-1.3	CL WITH SA
1313	09-18-91	5645.7	1874	-173	116.5	13.6	4/1313 6	114.3	14.1	101.9	-0.5	SC
1315	09-18-91	5645.3	1500	-136	113.3	11.7	4/1315 6	113.9	13.3	99.5	-1.6	SA CL WITH GR
1325	09-21-91	5647.9	1637	-130	118.0	12.8	4/1325 6	111.0	15.2	106.3	-2.4	SA CL WITH GR
1326	09-21-91	5645.7	1646	-310	121.6	11.6	4/1326 6	115.4	13.6	105.4	-2.0	SA CL WITH GR
1331	09-22-91	5648.8	1515	-73	116.0	13.0	4/1331 6	116.2	13.1	99.8	-0.1	SA CL WITH GR
1333	09-22-91	5648.2	1472	-88	118.7	12.2	4/1333 6	112.3	14.9	105.7	-2.7	SA CL WITH GR
1336	09-22-91	5650.1	1953	-57	121.9	13.0	4/1336 6	114.0	14.5	106.9	-1.5	SA CL
1337	09-23-91	5648.3	1550	-200	106.5	12.1	4/1337 6	109.6	16.1	97.2	**-4.0**	CL WITH SA
1346	09-24-91	5652.0	1777	-91	110.4	14.4	4/1346 6	108.2	17.2	102.0	-2.8	CL WITH SA
1337A	09-24-91	5648.2	1540	-194	108.2	15.8	4/1337A 6	107.7	17.7	100.5	-1.9	CL WITH SA
1348	09-25-91	5647.8	1542	-320	113.2	10.8	4/1348 6	112.4	14.4	100.7	**-3.6**	GR CL WITH SA
1352	09-25-91	5652.2	1525	-80	114.1	16.5	4/1352 6	106.5	17.5	107.1	-1.0	CL WITH SA
1361	09-28-91	5644.7	1450	-477	119.9	12.8	4/1361 6	113.1	15.8	106.0	-3.0	SA CL WITH GR
1364	09-29-91	5660.8	1698	-65	115.9	13.0	4/1364 6	113.9	14.8	101.8	-1.8	SA CL
1366	09-30-91	5656.2	1578	-65	116.7	14.5	4/1366 6	113.1	14.4	103.2	0.1	SA CL
1369	09-30-91	5658.4	2158	-128	121.1	12.6	4/1369 6	110.7	15.9	109.4	**-3.3**	SA CL
1374	10-01-91	5656.5	1382	-66	117.3	12.9	4/1374 6	113.7	15.1	103.2	-2.2	SA CL WITH GR
1378	10-02-91	5657.8	1586	-343	121.3	13.3	4/1378 6	113.7	15.3	106.7	-2.0	SA CL
1390	10-03-91	5657.7	1519	-302	121.2	13.0	4/1390 6	110.6	16.9	109.6	**-3.9**	CL WITH SA
1397	10-04-91	5650.8	1453	-469	115.4	12.0	4/1397 6	113.1	15.7	102.0	**-3.7**	SA CL
1399	10-04-91	5659.7	1820	-109	124.3	10.3	4/1399 6	118.5	13.5	104.9	**-3.2**	SA CL WITH GR
1347	09-24-91	5658.2	1518	-176	116.2	13.1	4/1347 6	111.6	15.2	104.1	-2.1	CL WITH SA
1399A	10-06-91	5658.8	1820	-109	117.1	11.4	4/1399A 6	114.6	14.5	102.2	**-3.1**	GR CL WITH SA
1412	10-07-91	5655.9	1535	-324	110.9	14.5	4/1412 6	110.4	17.2	100.5	-2.7	SA CL WITH GR
1418	10-08-91	5653.2	1782	-380	111.6	17.0	4/1418 6	105.6	18.7	105.7	-1.7	CL WITH SA
1421	10-08-91	5662.4	2143	-156	118.1	14.3	4/1421 6	109.2	17.6	108.2	**-3.3**	SA CL W CB & GR
1425	10-09-91	5661.8	1544	-44	110.6	13.7	4/1425 6	111.3	15.8	99.4	-2.1	SC WITH GR & CB
1427	10-09-91	5660.2	1397	-86	106.8	13.8	4/1427 6	106.8	17.2	100.0	**-3.4**	CL WITH SA
1451	10-10-91	5658.3	1693	-262	103.5	19.6	4/1451 6	102.4	20.7	101.1	-1.1	CL WITH SA
1461	10-13-91	5662.0	1980	-194	114.7	16.2	4/1461 6	111.1	16.2	103.2	0.0	CL WITH SA
1466	10-14-91	5656.4	2042	-429	112.6	16.5	4/1466 6	110.1	16.5	102.3	0.0	CL WITH SA
1473	10-16-91	5659.7	1881	-332	112.5	15.4	4/1473 6	113.9	14.7	98.8	0.7	SA CL
1475	10-16-91	5664.5	1473	-119	111.6	14.3	4/1475 6	106.8	15.4	104.5	-1.1	CL WITH SA
1484	10-17-91	5663.5	2063	-116	117.9	13.8	4/1484 6	112.1	16.1	105.2	-2.3	SA CL WITH GR
1492	10-18-91	5664.7	1508	-260	110.7	17.6	4/1492 6	106.0	19.4	104.4	-1.8	CL WITH SA
1494	10-19-91	5666.2	1403	-140	117.2	12.3	4/1494 6	111.2	15.0	105.4	-2.7	SA CL WITH GR
1497	10-20-91	5668.2	1968	-126	118.4	15.1	4/1497 6	109.7	16.5	107.9	-1.4	SA CL WITH GR
1501	10-22-91	5667.5	1355	-114	109.5	14.3	3/1501 6	106.8	17.8	102.5	**-3.5**	CL
1508	10-22-91	5665.1	1980	-287	106.0	15.7	4/1508 6	107.2	18.0	98.9	-2.3	GR CL WITH SA
1558	04-01-92	5668.2	1918	-62	115.6	15.9	4/1558 6	110.1	17.3	105.0	-1.4	CL WITH SA
1564	04-03-92	5668.5	1960	-171	117.2	11.7	4/1564	117.6	12.7	99.7	-1.0	GC WITH SA & CB
1572	04-06-92	5667.9	1576	-130	103.1	12.3	4/1572 6	108.8	17.7	**94.8**	**-5.4**	SA CL
1575	04-07-92	5666.9	1458	-258	107.7	13.8	4/1575 6	110.9	17.4	97.1	**-3.6**	CL WITH SA
1572A	04-07-92	5667.9	1576	-130	114.3	15.9	H/1572	108.8	17.7	105.1	-1.8	SA CL
1587	04-09-92	5669.3	1675	-200	107.3	16.7	4/1587 6	110.3	17.2	97.3	-0.5	CL WITH SA
1601	04-10-92	5664.1	1519	-375	103.3	18.7	4/1601 6	107.1	18.4	96.5	0.3	CL WITH SA
1603	04-11-92	5672.6	2040	-117	109.3	18.1	4/1603 6	110.1	17.4	99.3	0.7	CL WITH SA
1607	04-13-92	5665.1	1966	-400	123.7	12.7	4/1607	112.8	14.4	109.7	-1.7	SA CL WITH GR
1610	04-14-92	5670.5	1834	-52	109.7	16.2	4/1610 6	110.9	15.9	98.9	0.3	CL WITH SA
1640	04-25-92	5666.5	1846	-354	119.1	13.5	4/1640	111.8	14.7	106.5	-1.2	GR CL WITH SA
1642	04-26-92	5669.5	2112	-183	118.5	13.8	4/1642 6	114.1	14.9	103.9	-1.1	SA CL

QUALITY ACCEPTANCE TESTING - COMPACTION REPORT											REPORT NUMBER: RI.2		PAGE 4 OF 8
TEST NUMBER	DATE	ELEV	LOCATION		FIELD		STANDARD LAB COMPACTION			PERCENT COMPACTION	PERCENT +- OMC	CLASSIFICATION	
			STATION	OFFSET	DRY DENS (PCF)	MC %	TEST METH	MX DRY DEN	OMC %				
1645	04-27-92	5675.3	1326	-262	114.9	14.9	4/1645	114.0	15.2	100.8	-0.3	GR CL WITH SA	
1654	04-27-92	5670.7	1397	-91	120.9	12.9	4/1654	114.1	14.3	106.0	-1.4	SA CL WITH GR	
1661	04-28-92	5671.0	2033	-250	111.0	17.7	3/1661 6	110.1	17.4	100.8	0.3	SA CL	
1663	04-29-92	5666.5	2146	-348	114.1	14.9	4/1663 6	111.9	16.3	102.0	-1.4	CL WITH SA	
1645A	04-29-92	5667.4	1337	-271	115.0	15.0	4/1645	114.0	15.2	100.9	-0.2	GR CL WITH SA	
1672	04-30-92	5673.7	1800	-139	107.1	20.4	3/1672 6	105.3	19.3	101.7	**1.1**	CL WITH SA	
1678	05-01-92	5667.8	1922	-300	118.4	13.3	4/1678 6	111.6	15.9	106.1	-2.6	CL WITH SA	
1680	05-02-92	5673.0	2200	-61	109.1	17.5	4/1680 6	108.5	18.0	100.6	-0.5	CL WITH SA	
1687	05-04-92	5673.3	1502	-197	109.9	17.9	4/1687 6	108.9	17.9	100.9	0.0	CL WITH SA	
1694	05-05-92	5672.5	1441	-288	110.5	13.1	4/1694 6	112.3	16.2	98.4	**-3.1**	CL WITH SA	
1700	05-06-92	5677.3	1503	-113	111.3	15.1	4/1700 6	109.8	17.4	101.4	-2.3	SA CL	
1702	05-07-92	5671.3	1584	-385	112.7	15.3	4/1702 6	109.9	16.2	102.5	-0.9	SA CL	
1703	05-08-92	5680.9	1852	-61	110.7	18.1	4/1703 6	105.1	19.6	105.3	-1.5	CL WITH SA	
1707	05-11-92	5673.1	1981	-345	110.8	16.4	4/1707 6	111.4	15.7	99.5	0.7	SA CL WITH GR	
1712	05-12-92	5680.3	1676	-128	113.4	15.8	4/1712 6	111.6	16.9	101.6	-1.1	SA CL	
1715	05-12-92	5679.3	1828	-206	112.5	16.3	4/1715 6	109.9	16.9	102.4	-0.6	SA CL	
1716	05-14-92	5683.7	1696	-228	113.6	16.3	4/1716 6	111.3	16.4	102.1	-0.1	CL WITH SA	
1721	05-14-92	5677.1	1618	-296	115.6	15.1	4/1721 6	110.9	16.6	104.2	-1.5	CL WITH SA	
1723	05-15-92	5676.7	1421	-332	108.7	17.8	4/1723 6	109.5	17.2	99.3	0.6	SA CL	
1726	05-16-92	5689.8	1716	-59	108.0	14.8	4/1726 6	109.8	17.7	98.4	-2.9	CL WITH SA	
1728	05-16-92	5677.4	2040	-326	124.2	10.5	4/1728	116.4	12.5	106.7	-2.0	GR CL W/SA & CB	
1730	05-16-92	5679.2	1809	-300	106.3	16.9	4/1730 6	108.2	17.9	98.2	-1.0	CL WITH SA	
1732	05-17-92	5679.6	1882	-308	112.8	15.6	4/1732 6	113.8	14.9	99.1	0.7	GR CL WITH SA	
1734	05-17-92	5681.9	1452	-195	105.9	16.0	4/1734 6	106.6	18.1	99.3	-2.1	CL WITH SA	
1736	05-18-92	5682.9	1662	-245	113.6	15.5	4/1736 6	106.5	18.0	106.7	-2.5	CL WITH SA	
1742	05-19-92	5685.4	1550	-122	114.8	15.3	4/1742	109.6	16.8	104.7	-1.5	GR CL W/SA & CB	
1750	05-27-92	5682.2	1313	-178	116.7	13.7	4/1750 6	114.3	14.4	102.1	-0.7	SA CL WITH GR	
1752	05-27-92	5683.4	1828	-300	108.5	15.5	4/1752 6	114.4	14.5	**94.8**	1.0	GR CL WITH SA	
1756	05-27-92	5687.3	1569	-73	109.1	17.9	4/1756 6	104.9	18.8	104.0	-0.9	CL WITH SA	
1759	05-28-92	5685.4	2114	-216	116.8	14.2	4/1759	110.9	15.6	105.3	-1.4	SA CL WITH GR	
1762	05-28-92	5685.3	1577	-252	112.7	15.2	4/1762	110.9	15.1	101.6	0.1	GR CL WITH SA	
1764	05-29-92	5684.2	1383	-242	112.3	15.0	4/1764 6	106.8	18.0	105.1	-3.0	SA CL	
1767	05-29-92	5687.1	1477	-114	109.2	16.5	4/1767 6	108.9	17.3	100.3	-0.8	CL WITH SA	
1768	05-29-92	5687.5	2236	-75	108.5	18.1	4/1768	110.8	16.0	97.9	**2.1**	GR CL WITH SA	
1772	05-30-92	5687.9	1550	-200	109.0	17.6	4/1772 6	106.9	18.5	102.0	-0.9	CL WITH SA	
1776	05-31-92	5690.4	2075	-112	110.4	14.2	4/1776 6	113.9	14.4	96.9	-0.2	GR CL WITH SA	
1780	06-01-92	5690.5	1594	-94	115.0	15.0	4/1780 6	111.4	15.7	103.2	-0.7	SA CL	
1782	06-01-92	5692.0	1790	-68	108.9	18.5	4/1782 6	105.2	19.6	103.5	-1.1	CL WITH SA	
1786	06-02-92	5685.9	2200	-324	110.4	15.6	4/1786 6	105.0	19.2	105.1	**-3.6**	CL WITH SA	
1787	06-02-92	5687.7	1279	-179	110.5	16.6	4/1787	106.4	17.7	103.9	-1.1	SA CL WITH GR	
1791	06-02-92	5689.4	2253	-140	110.1	18.8	4/1791 6	111.1	16.7	99.1	**2.1**	SA CL WITH GR	
1792	06-03-92	5690.3	1446	-183	108.9	19.0	4/1792 6	102.9	21.0	105.8	-2.0	CL WITH SA	
1796	06-03-92	5686.7	1890	-348	115.3	13.5	4/1796 6	110.3	17.2	104.5	**-3.7**	SA CL	
1798	06-04-92	5691.0	1724	-271	118.1	13.5	4/1798	120.6	11.3	97.9	**2.2**	GC WITH SA & CB	
1803	06-05-92	5692.0	2260	-168	115.0	14.6	4/1803 6	110.7	17.0	103.9	-2.4	CL WITH SA	
1817	06-08-92	5689.4	1471	-322	111.6	16.1	4/1817 6	108.4	18.0	103.0	-1.9	SA CL	
1819	06-08-92	5695.4	1927	-75	118.4	13.0	4/1819 6	110.1	15.9	107.5	-2.9	CL WITH SA	
1821	06-09-92	5692.3	2189	-200	109.5	16.9	4/1821 6	106.4	18.9	102.9	-2.0	CL WITH SA	
1825	06-10-92	5693.1	1772	-275	109.0	15.9	4/1825 6	109.1	16.8	99.9	-0.9	CL WITH SA	
1830	06-10-92	5694.2	1354	-66	110.2	17.5	4/1830 6	104.9	20.2	105.1	-2.7	CL WITH SA	
1836	06-11-92	5695.3	2295	-162	111.1	16.4	4/1836	107.3	17.0	103.5	-0.6	SA CL WITH GR	
1840	06-11-92	5693.7	1717	-300	121.4	11.5	4/1840	116.7	12.0	104.0	-0.5	GC WITH SA & CB	

TEST NUMBER	DATE	ELEV	LOCATION		FIELD		STANDARD LAB COMPACTION			PERCENT COMPACTION	PERCENT +- OMC	CLASSIFICATION
			STATION	OFFSET	DRY DENS (PCF)	MC %	TEST METH	MX DRY DEN	OMC %			
1847	06-12-92	5697.7	1545	-91	114.2	13.8	4/1847 6	108.7	16.4	105.1	-2.6	CL WITH SA
1850	06-13-92	5699.5	1650	-122	116.4	10.7	4/1850 6	114.2	13.3	101.9	-2.6	SA CL WITH GR
1852	06-18-92	5696.2	1918	-235	115.7	15.0	4/1852 6	110.5	17.0	104.7	-2.0	CL WITH SA
1854	06-18-92	5697.1	1403	-205	115.9	14.2	4/1854 6	113.8	14.9	101.8	-0.7	CL WITH SA
1856	06-19-92	5700.7	1851	-123	117.3	12.6	4/1856	116.3	12.9	100.9	-0.3	SA CL W/GR & CB
1862	06-19-92	5697.2	1932	-303	109.9	15.0	4/1862	110.3	15.9	99.6	-0.9	SA CL W/GR & CB
1866	06-20-92	5700.2	1454	-118	123.9	11.9	4/1866	118.0	13.2	105.0	-1.3	GC WITH SA & CB
1869	06-21-92	5696.7	1595	-331	116.8	14.0	4/1869	116.4	13.4	100.3	0.6	GR CL W/SA & CB
1871	06-22-92	5698.4	1303	-230	117.0	15.1	4/1871 6	115.8	14.1	101.0	1.0	SA CL WITH GR
1872	06-23-92	5701.8	1622	-225	117.2	13.9	4/1872 6	112.2	15.0	104.5	-1.1	SA CL W/GR & CB
1879	06-23-92	5698.7	2183	-308	120.2	13.1	4/1879 6	115.4	15.6	104.2	-2.5	SC WITH GR & CB
1881	06-23-92	5702.8	2093	-64	115.2	15.3	4/1881 6	110.1	16.9	104.6	-1.6	SA CL
1887	06-24-92	5704.0	1952	-169	114.7	14.6	4/1887	113.1	14.5	101.4	0.1	SA CL W/GR & CB
1888	06-25-92	5703.3	1496	-200	119.5	12.6	4/1888	113.4	14.5	105.4	-1.9	SA CL W/GR & CB
1896	06-25-92	5706.3	1761	-60	113.7	13.6	4/1896 6	109.7	16.2	103.6	-2.6	SA CL WITH GR
1899	06-26-92	5701.6	1469	-311	109.6	13.2	4/1899	109.8	15.1	99.8	-1.9	GR CL W/SA & CB
1906	06-27-92	5708.0	1760	-70	120.6	12.6	4/1906	111.2	14.7	108.5	-2.1	GR CL WITH SA
1909	06-27-92	5705.9	2254	-69	110.3	16.6	4/1909 6	112.1	16.3	98.4	0.3	SA CL
1912	06-28-92	5706.1	2109	-180	115.7	15.1	4/1912 6	110.1	16.6	105.1	-1.5	SA CL
1918	06-29-92	5705.6	1364	-127	115.0	16.9	4/1918 6	113.4	15.4	101.4	*1.5*	SA CL
1921	06-29-92	5708.5	1670	-218	112.4	16.2	4/1921 6	110.2	16.5	102.0	-0.3	SA CL
1932	07-02-92	5709.8	1645	-300	114.9	16.3	4/1932 6	109.7	16.9	104.7	-0.6	CL WITH SA
1934	07-03-92	5710.5	1531	-65	113.3	17.8	4/1934 6	106.3	19.4	106.6	-1.6	CL WITH SA
1938	07-03-92	5708.1	2275	-205	117.3	11.6	4/1938	112.9	13.8	103.9	-2.2	SA CL W/GR & CB
1943	07-06-92	5710.5	2020	-213	112.0	16.7	4/1943 6	108.7	18.3	103.0	-1.6	CL WITH SA
1947	07-07-92	5713.2	1605	-87	109.4	14.4	4/1947 6	106.9	18.0	102.3	*-3.6*	SA CL W/GR & CB
1952	07-07-92	5709.6	2117	-271	123.3	10.2	4/1952	114.8	14.5	107.4	*-4.3*	GR CL W/SA & CB
1957	07-08-92	5714.5	1653	-271	112.8	16.8	4/1957 6	107.7	17.0	104.7	-0.2	SA CL WITH GR
1959	07-08-92	5712.2	2100	-163	113.3	16.0	4/1959 6	111.7	16.2	101.4	-0.2	SA CL WITH GR
1965	07-09-92	5715.3	1474	-163	107.9	16.6	4/1965 6	107.7	19.0	100.2	-2.4	CL WITH SA
1968	07-10-92	5717.6	1835	-127	108.2	18.2	4/1968 6	106.0	18.6	102.1	-0.4	CL WITH SA
1971	07-10-92	5712.7	2239	-264	115.3	13.8	4/1971 6	113.1	15.2	101.9	-1.4	SA CL
1974	07-11-92	5712.7	1235	-88	110.0	17.5	4/1974 6	106.8	19.1	103.0	-1.6	CL WITH SA
1978	07-15-92	5714.0	2281	-63	102.3	20.2	4/1978 6	102.3	22.3	100.0	-2.1	CL WITH SA
1980	07-15-92	5718.4	1550	-174	114.5	15.8	4/1980 6	108.9	17.0	105.1	-1.2	CL WITH SA
1985	07-16-92	5714.2	1240	-213	128.2	10.6	4/1985	117.8	13.2	108.8	-2.6	GC WITH SA
1988	07-16-92	5718.2	2035	-60	116.6	13.5	4/1988	114.3	14.9	102.0	-1.4	SA CL WITH GR
1989	07-17-92	5714.6	2302	-229	115.9	14.2	4/1989 6	110.9	16.3	104.5	-2.1	SA CL
1992	07-17-92	5719.6	2135	-77	112.0	16.7	4/1992 6	111.7	16.0	100.3	0.7	SA CL
1994	07-18-92	5718.6	2350	-75	104.5	17.9	4/1994 6	106.7	18.4	97.9	-0.5	CL WITH SA
2003	07-18-92	5722.4	1848	-198	113.7	15.7	4/2003 6	110.6	17.1	102.8	-1.4	CL WITH SA
2005	07-19-92	5709.4	1200	-359	115.6	15.0	4/2005	110.9	15.8	104.2	-0.8	SA CL WITH GR
2008	07-20-92	5721.0	1540	-246	118.4	14.4	4/2008	117.1	12.8	101.1	*1.6*	SA CL W/GR & CB
2010	07-20-92	5722.2	1619	-250	109.9	15.4	4/2010 6	111.0	16.3	99.0	-0.9	SA CL
2014	07-20-92	5724.1	1759	-50	110.0	16.7	4/2014 6	112.0	16.4	98.2	0.3	SA CL
2017	07-21-92	5719.7	2214	-164	108.4	14.9	4/2017 6	110.8	15.8	97.8	-0.9	CL WITH SA
2021	07-21-92	5720.0	1294	-209	103.5	18.8	4/2021 6	107.3	18.5	96.5	0.3	CL WITH SA
2027	07-22-92	5724.1	1412	-153	112.3	15.7	4/2027 6	111.9	15.8	100.4	-0.1	SA CL
2032	07-23-92	5724.5	1758	-250	112.7	13.5	4/2032	113.3	15.0	99.5	-1.5	GR CL W/SA & CB
2037	07-24-92	5722.8	2050	-253	122.1	11.6	4/2037	114.1	14.2	107.0	-2.6	SA CL WITH GR
2040	07-24-92	5727.4	1389	-99	123.5	11.4	4/2040 6	114.5	14.0	107.9	-2.6	SA CL
2044	07-27-92	5728.2	1688	-159	114.0	16.2	4/2044 6	112.1	15.9	101.7	0.3	SA CL

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TEST NUMBER	DATE	ELEV	LOCATION		FIELD		STANDARD LAB COMPACTION			PERCENT COMPACTION	PERCENT +- OMC	CLASSIFICATION
			STATION	OFFSET	DRY DENS (PCF)	MC %	TEST METH	MX DRY DEN	OMC %			
2046	07-27-92	5725.4	2103	-88	111.9	16.6	4/2046	109.2	17.7	102.5	-1.1	SA CL WITH GR
2056	07-28-92	5727.6	1261	-235	117.6	14.2	4/2056 6	112.3	15.1	104.7	-0.9	SA CL
2058	07-29-92	5727.8	1963	-50	114.9	14.7	4/2058	113.1	13.7	101.6	1.0	SA CL W/CB & GR
2061	07-29-92	5728.6	2034	-128	112.7	15.3	4/2061 6	108.0	17.4	104.4	-2.1	CL WITH SA
2065	07-30-92	5731.5	1365	-88	116.2	14.7	4/2065 6	110.8	16.4	104.9	-1.7	CL WITH SA
2071	07-30-92	5732.7	1692	-125	112.5	16.1	4/2071 6	110.6	16.8	101.7	-0.7	CL WITH SA
2077	07-30-92	5730.4	2039	-170	110.0	17.8	4/2077 6	108.2	17.4	101.7	0.4	CL WITH SA
2079	07-31-92	5733.1	1748	-131	112.5	18.0	4/2079 6	110.5	17.0	101.8	1.0	CL WITH SA
2082	07-31-92	5732.5	1532	-51	110.5	17.5	4/2082 6	111.6	16.1	99.0	***1.4***	SA CL
2084	07-31-92	5731.6	2084	-195	112.7	12.0	4/2084	112.1	15.3	100.5	***-3.3***	SA CL WITH GR
2087	08-01-92	5736.0	1418	-197	109.0	18.4	4/2086 6	112.3	15.8	97.1	***2.6***	CL WITH SA
2101	08-03-92	5731.4	2164	-212	120.3	10.7	4/2101	119.2	12.0	100.9	-1.3	SA CL W/GR & CB
2102	08-03-92	5734.7	1836	-61	120.9	12.0	4/2102	116.7	13.2	103.6	-1.2	SA CL WITH GR
2107	08-04-92	5733.9	1891	-226	108.3	17.9	4/2107 6	110.1	16.7	98.4	***1.2***	CL WITH SA
2110	08-04-92	5731.1	2330	-145	111.3	18.6	4/2110 6	107.2	18.6	103.8	0.0	CL WITH SA
2113	08-05-92	5732.6	1229	-64	115.3	14.4	4/2113	113.9	14.6	101.2	-0.2	SA CL WITH GR
2116	08-05-92	5738.2	1627	-209	111.8	14.2	4/2116	109.8	15.7	101.8	-1.5	SA CL WITH GR
2119	08-06-92	5730.1	2446	-77	106.2	16.8	4/2119	111.7	16.0	95.1	0.8	SA CL WITH GR
2124	08-07-92	5732.7	1204	-59	111.4	16.3	4/2124	110.0	16.4	101.3	-0.1	SA CL WITH GR
2125	08-07-92	5739.6	1801	-51	113.2	15.7	4/2125 6	109.0	17.1	103.9	-1.4	CL WITH SA
2131	08-10-92	5743.3	1550	-140	111.9	17.0	4/2131 6	110.3	16.5	101.5	0.5	CL WITH SA
2132	08-10-92	5744.4	1575	-191	109.0	18.4	4/2132 6	108.8	17.7	100.2	0.7	CL WITH SA
2140	08-11-92	5733.3	2496	-56	116.5	13.5	4/2140 6	107.9	15.4	108.0	-1.9	SA CL
2144	08-12-92	5740.7	1260	-94	116.0	14.2	4/2144 6	111.1	15.6	104.4	-1.4	CL WITH SA
2155	08-13-92	5743.7	1519	-62	120.4	13.3	4/2155	116.3	12.6	103.5	0.7	SA CL W/GR & CB
2157	08-13-92	5743.0	2157	-198	107.7	15.3	4/2157 6	106.6	18.0	101.0	-2.7	SA CL
2176	08-14-92	5747.3	1397	-121	116.2	14.7	4/2176 6	113.1	15.0	102.7	-0.3	SA CL
2180	08-15-92	5745.3	1976	-49	121.5	10.9	4/2180	119.4	11.3	101.8	-0.4	GC WITH SA & CB
2182	08-15-92	5749.4	1510	-147	124.8	11.5	4/2182	117.8	13.3	105.9	-1.8	SA CL WITH GR
2189	08-17-92	5748.2	1557	-78	121.7	12.8	4/2189	115.5	14.1	105.4	-1.3	SA CL WITH GR
2193	08-18-92	5744.4	2405	-140	108.1	14.4	4/2193 6	109.6	16.8	98.6	-2.4	CL WITH SA
2197	08-18-92	5749.2	1784	-143	116.7	15.1	4/2197 6	109.1	17.3	107.0	-2.2	CL
2199	08-19-92	5748.9	1305	-119	112.5	16.3	4/2199 6	113.8	15.2	98.9	***1.1***	CL WITH SA
2200	08-19-92	5748.8	2206	-93	120.7	11.4	4/2200 6	117.7	13.3	102.5	-1.9	SA CL
2203	08-19-92	5746.8	2497	-176	118.2	14.4	4/2203	113.0	15.0	104.6	-0.6	SA CL WITH GR
2205	08-20-92	5748.9	1240	-183	107.1	16.3	4/2205 6	104.9	18.8	102.1	-2.5	CL WITH SA
2209	08-21-92	5753.9	1749	-43	114.0	15.9	4/2209 6	107.7	17.5	105.8	-1.6	CL WITH SA
2218	08-23-92	5753.4	1359	-64	115.2	15.7	4/2218 6	111.6	17.0	103.2	-1.3	CL WITH SA
2222	08-24-92	5752.3	2147	-177	98.0	20.7	4/2222 6	96.3	24.9	101.8	***-4.2***	CH WITH SA
2224	08-25-92	5751.6	2247	-153	124.4	11.6	4/2224 6	118.4	13.4	105.1	-1.8	SA CL
2228	08-26-92	5757.3	1503	-47	128.4	6.7	4/2228	126.3	9.3	101.7	-2.6	SC WITH GR
2229	08-26-92	5757.1	1486	-110	122.5	12.3	4/2229	118.5	13.3	103.4	-1.0	SA CL WITH GR
2232	08-26-92	5755.9	2229	-110	115.8	12.4	4/2232 6	110.3	16.4	105.0	***-4.0***	SA CL
2235	08-27-92	5755.7	2534	-62	124.7	8.8	4/2235	122.7	10.1	101.6	-1.3	SC WITH GR & CB
2242	08-28-92	5759.0	1208	-67	122.8	10.8	4/2242	121.9	10.5	100.7	0.3	SC WITH GR & CB
2251	08-29-92	5758.2	2056	-56	133.1	7.8	4/2251	123.7	10.1	107.6	-2.3	SC WITH GR
2252	08-29-92	5759.9	1914	-139	111.6	14.2	4/2252 6	108.7	15.4	102.7	-1.2	SA CL
2255	08-30-92	5763.2	1592	-85	125.0	10.2	4/2255 6	121.8	11.7	102.6	-1.5	SA CL
2258	08-30-92	5763.1	1396	-137	118.6	13.5	4/2258 6	114.2	15.2	103.9	-1.7	SA CL
2261	09-01-92	5760.0	2338	-71	116.2	14.6	4/2261 6	110.4	16.7	105.3	-2.1	CL WITH SA
2262	09-01-92	5763.8	1334	-88	104.2	14.5	4/2262 6	108.7	17.4	95.9	-2.9	CL WITH SA
2275	09-03-92	5764.7	1413	-45	113.2	12.3	4/2275	113.0	15.0	100.2	-2.7	SA CL W/GR & CB

QUALITY ACCEPTANCE TESTING - COMPACTION REPORT REPORT NUMBER: RI.2

TEST NUMBER	DATE	ELEV	LOCATION STATION	LOCATION OFFSET	FIELD DRY DENS (PCF)	FIELD MC %	STANDARD LAB COMPACTION TEST METH	STANDARD LAB COMPACTION MX DRY DEN	STANDARD LAB COMPACTION OMC %	PERCENT COMPACTION	PERCENT +- OMC	CLASSIFICATION
2279	09-08-92	5767.5	1519	-59	106.0	19.2	4/2279 6	106.0	18.2	100.0	1.0	CL WITH SA
2280	09-09-92	5762.7	2505	-85	115.8	13.2	4/2280 6	111.8	15.9	103.6	-2.7	SA CL
2288	09-10-92	5767.2	2518	-39	122.9	10.1	4/2288	119.7	12.5	102.7	-2.4	GC WITH SA
2292	09-10-92	5767.3	1758	-111	111.6	16.3	4/2292	107.5	17.5	103.8	-1.2	SA CL WITH GR
2294	09-11-92	5766.9	2482	-110	111.5	16.8	4/2294 6	104.9	19.0	106.3	-2.2	CL WITH SA
2301	09-12-92	5770.3	2583	-91	104.1	18.9	4/2301 6	105.6	19.7	98.6	-0.8	SA CL
2302	09-12-92	5772.1	2071	-49	109.5	13.8	4/2302 6	105.9	17.9	103.4	-4.1	SA CH
2305	09-13-92	5774.5	1541	-44	121.3	11.4	4/2305	118.7	12.6	102.2	-1.2	SC WITH GR & CB
2307	09-13-92	5774.9	1815	-66	111.1	14.8	4/2307	110.2	15.7	100.8	-0.9	GR CL W/SA & CB
2310	09-13-92	5775.0	1800	-77	118.0	15.1	4/2310 6	116.6	14.6	101.2	0.5	SA CL
2313	09-14-92	5775.2	1376	-72	113.6	12.9	4/2313 6	110.3	16.6	103.0	-3.7	SA CL
2316	09-15-92	5775.8	1161	-89	117.3	12.4	4/2316	110.4	15.2	106.2	-2.8	SA CL WITH GR
2320	09-16-92	5778.6	2092	-72	114.7	15.4	4/2320 6	107.5	18.0	106.7	-2.6	CL WITH SA
2322	09-16-92	5780.1	2155	-49	112.2	16.0	4/2322	110.6	16.6	101.4	-0.6	SA CL WITH GR
2330	09-17-92	5779.4	1230	-86	114.6	14.7	4/2330	108.7	16.6	105.4	-1.9	SA CL WITH GR
2333	09-18-92	5776.9	2577	-61	104.3	20.7	4/2333 6	104.8	19.8	99.5	0.9	CL WITH SA
2334	09-18-92	5783.1	1402	-73	119.4	13.8	4/2334 6	113.9	15.5	104.8	-1.7	SA CL
2339	09-18-92	5777.5	2573	-58	114.2	16.3	4/2339	108.0	18.1	105.7	-1.8	SA CL WITH GR
2350	09-22-92	5785.0	2631	-68	116.8	12.6	4/2350	111.7	15.0	104.6	-2.4	GC WITH SA & CB
2351	09-22-92	5790.3	2252	-41	121.9	12.0	4/2351	117.5	12.0	103.7	0.0	GC WITH SA & CB
2355	09-22-92	5798.8	1796	-35	118.7	12.2	4/2355	113.0	14.7	105.0	-2.5	GC WITH SA
2358	09-23-92	5788.9	2502	-48	112.1	16.9	4/2358	109.5	16.0	102.4	0.9	GR CL WITH SA
2362	09-25-92	5788.3	2650	-50	128.9	8.8	4/2362	125.3	9.2	102.9	-0.4	GC WITH SA & CB
2370	09-25-92	5796.4	1171	-43	118.7	14.9	4/2370 6	109.9	17.2	108.0	-2.3	SA CL
2372	09-26-92	5792.8	2610	-42	123.2	10.5	4/2372	124.2	9.7	99.2	0.8	GC WITH SA & CB
2381	09-30-92	5804.0	1475	-22	132.7	6.5	4/2381	129.7	8.6	102.3	-2.1	GC WITH SA & CB
2384	10-02-92	5804.7	2485	-23	125.7	7.2	4/2384	125.8	8.8	99.9	-1.6	GC WITH CB & SA

TEST NUMBER	DATE	ELEV	LOCATION		FIELD		STANDARD LAB COMPACTION			PERCENT COMPACTION	PERCENT +- OMC	CLASSIFICATION
			STATION	OFFSET	DRY DENS (PCF)	MC %	TEST METH	MX DRY DEN	OMC %			

NOTE: Explanation of Column Headed TEST METH - 5/110 6

This indicates lab comparison type

5 - 5 point proctor
1 or 2 - 1 or 2 point proctor
H - historical proctor

All mold diameters are 12 inch unless noted here.

proctor number used for comparison to field data

IN-PLACE - TEST RANGES FOR TESTS IN EMBANKMENT FOR THIS REPORT

FIELD DRY DENSITY MIN	98.0	FIELD M.C. MIN	6.5	AVGERAGE PERCENT COMPACTION THIS REPORT	102.3
FIELD DRY DENSITY MAX	133.1	FIELD M.C. MAX	22.4	PERCENT COMPACTIONS <95% AND >93% THIS REPORT	1.2
FIELD DRY DENSITY AVG	113.6	FIELD M.C. AVG	14.8	PERCENT COMPACTIONS <93% THIS REPORT	0.9

LAB - CUMULATIVE 3,4,5 POINT PROCTOR RANGE - ALL TESTS TO 12-31-92

				AVERAGE PERCENT COMPACTION TO 12-31-92	102.3
MAX. DRY DENSITY MIN	93.3	O.M.C. MIN	8.6	PERCENT COMPACTIONS <95% AND >93% TO 12-31-92	1.2
MAX. DRY DENSITY MAX	129.7	O.M.C. MAX	24.9	PERCENT COMPACTIONS <93% TO 12-31-92	0.9
MAX. DRY DENSITY AVG	111.2	O.M.C. AVG	15.9		

COMMENT: THIS REPORT COVERS THE ENTIRE CONSTRUCTION OF THE DAM.

LAB CHIEF: ______________________

SUBMITTED BY: ______________________
PROJECT ENGINEER

QUALITY ACCEPTANCE TESTING - COMMENTS REPORT	REPORT NUMBER: RI.3	PAGE 1 OF 7
PROJECT: LITTLE DELL LAKE, DAM AND APPURTENANCES RIVER: SALT LAKE CITY STREAMS STATE: UTAH TOWN: SALT LAKE CITY	CONTRACT NO. DACW05-89-C-0045 CONTRACTOR: CLEMENT BROTHERS AND J.E. STARNES CO.	DATE OF REPORT: 12-07-92 01-01-90 THRU 12-31-92

EMBANKMENT ZONE	MIN. DESIGNED % COMP	SPEC. W.C. % RANGE	LOOSE LIFT THICK. (IN)	NUMBER OF PASSES	COMPACTION EQUIPMENT
RANDOM I	95	-3 TO 1	8	6	CAT 825C, SP-60

TEST NUMBER	TEST IN SPEC	STATUS FAILED TESTS	TEST COMMENTS
581	Y		SOURCE-U/S BORROW. GRAD.PROCTOR. DENSITY FROM TEST 581A.MC IS SLIGHTLY OUT OF SPEC.
781	N	OLD,M	SOURCE-RI/FINE GRAINED STOCKPILE. DENS.GRAD.PROCTOR.REPRESENTS AREA 150 TO 450 D/S,1400 TO 1650.
786	Y		SOURCE-FINE GRAINED STOCKPILE. DENS.GRAD.PROCTOR.
790	N	OLM	SOURCE-FINE GRAINED STOCKPILE. DENS.GRAD.PROCTOR.
793	Y		SOURCE-FINE GRAINED STOCKPILE. DENS.GRAD.PROCTOR.
796	N	OLM	SOURCE-FINE GRAINED SOCCKPILE. DENS.GRAD.PROCTOR.
802	Y		SOURCE-FINE GRAINED STOCKPILE. DENS.GRAD.PROCTOR.
804	N	OLD	SOURCE-FINE GRAINED STOCKPILE. DENS.GRAD.PROCTOR. REPRESENTS AREA 1400 TO 1700 , 200 TO 350 D/S.
808	N	OLM	SOURCE-FINE GRAINED STOCKPILE. DENS.GRAD.PROCTOR.
811	Y		SOURCE-FINE GRAINED STOCKPILE. DENS.GRAD.PROCTOR.
812	Y		SOURCE-FINE GRAINED STOCKPILE. DENS.GRAD. 3PT PROCTOR CAT 825 AREA.
823	Y		SOURCE-FINE GRAINED STOCKPILE. DENS.GRAD.PROCTOR.
829	N	OLM	SOURCE-DAM FOOTPRINT EXCAVATION. DENS.GRAD. PROCTOR.
833	N	OLM	SOURCE-DAM FOOTPRINT EXCAVATION. DENS.GRAD. 2PT PROCTOR MATCH.
834	N	OLD	SOURCE-FINE GRAINED STOCKPILE. DENS.PROCTOR,USE GRADATION FROM 830. REPRESENTS AREA 550 TO 670 D/S,1400 TO 1650.
843	Y		SOURCE-DAM FOOTPRINT EXCAVATION. DENS.GRAD.2PT PROCTOR RAVINE HAUL ROAD REPAIR.
848	Y		SOURCE-FINE GRAINED SOCKPILE AREA. DENS.GRAD.PROCTOR. PAIR WITH TEST 849.
850	Y		SOURCE-FINE GRAINED STOCKPILE AREA. DENS.GRAD.PROCTOR.
853	N	OLM	SOURCE-FINE GRAINED STOCKPILE. DENS.GRAD.PROCTOR, 2PT MATCH. CAT 825.
859	Y		SOURCE FINE GRAINED STOCKPILE. DENS.GRAD.PROCTOR. CAT 825.
860	Y		SOURCE-FINE GRAINED STOCKPILE. DENS.GRAD.PROCTOR.
861	Y		SOURCE-FINE GRAINED STOCKPILE. DENS.GRAD.PROCTOR
862	Y		SOURCE-FINE GRAINED STOCKPILE. DENS.GRAD.PROCTOR. SPF60
863	Y		SOURCE-FINE GRAINED STOCKPILE. DENS.GRAD.2 PT PROCTOR.SPF60
864	Y		SOURCE-FINE GRAINED STOCKPILE. DENS.GRAD.PROCTOR. CAT 825
865	Y		SOURCE-FINE GRAINED STOCKPILE. DENS.GRAD.PROCTOR, 2PT MATCH. CAT 825.
868	Y		SOURCE-FINE GRAINED STOCKPILE. DENS.GRAD.PROCTOR. SPF 60.
875	N	OLM	SOURCE-FINE GRAINED STOCKPILE AREA. DENS.GRAD.PROCTOR.SPF-60.
876	N	RW	SOURCE-FINE GRAINED STOCKPILE AREA. DENS.GRAD.PROCTOR.REPRESENTS AREA 1380 TO 1720,200 TO 500 D/S. SPF-60. REWORKED.
882	Y		SOURCE-FINE GRAINED STOCKPILE AREA. DENS.GRAD.PROCTOR.
892	Y		SOURCE-FINE GRAINED STOCKPILE AREA. DENS.GRAD.PROCTOR.
894	Y		SOURCE-FINE GRAINED STOCKPILE AREA. DENS.GRAD.PROCTOR.CAT825.
897	N	OLD	SOURCE-FINE GRAINED STOCKPILE AREA. DENS.GRAD.PROCTOR.
900	Y		SOURCE-FINE GRAINED STOCKPILE AREA. DENS.GRAD.PROCTOR.
901	Y		SOURCE-FINE GRAINED STOCKPILE AREA. DENS.GRAD.PROCTOR.
903	Y		SOURCE-FINE GRAINED STOCKPILE AREA. DENS.GRAD.PROCTOR.
910	Y		SOURCE-FINE GRAINED STOCKPILE AREA. DENS GRAD.PROCTOR.CAT825 & SPF 60 MIXED.
912	Y		SOURCE-FINE GRAINED STOCKPILE AREA. DENS.GRAD.PROCTOR.CAT825C ONLY,SPF60 MOVED TO THE CORE.
915	Y		SOURCE-FINE GRAINED STOCKPILE AREA. DENS.GRAD.PROCTOR.CAT825C.
929	Y		SOURCE-BETWEEN SECT. 4 & 6,ABOVE OLD HIGHWAY. DENS.GRAD.PROCTOR. CAT 825C.
930	N	OLM	SOURCE-150 FT. NORTH OF FINE GRAINED STOCKPILE. DENS.GRAD.PROCTOR. CAT 825C.
934	Y		SOURCE- NOT RECORDED. DENS.GRAD.PROCTOR.CAT·825.
938	Y		SOURCE-FINE GRAINED STOCKPILE AREA. DENS.GRAD.PROCTOR.CAT 825.

TEST NUMBER	TEST IN SPEC	STATUS FAILED TESTS	TEST COMMENTS
939	Y		SOURCE-NOT SPECIFIC. DENS GRAD.PROCTOR.
947	Y		SOURCE-NOT SPECIFIC. DENS.GRAD.PROCTOR.
950	Y		SOURCE-NOT SPECIFIC. DENS.GRAD.PROCTOR.
956	Y		SOURCE-FINE GRAINED STOCKPILE AREA. DENS.GRAD.PROCTOR.CAT825C.
957	Y		SOURCE-NOT SPECIFIC. DENS.GRAD.PROCTOR. CAT825.
963	N	OLM	SOURCE-FINE GRAINED STOCKPILE AREA. DENS.GRAD.PROCTOR.
969	Y		SOURCE-FINE GRAINED STOCKPILE AREA. DENS.GRAD.PROCTOR.CAT 825
981	N	OLM	SOURCE-FINE GRAINED STOCKPILE AREA. DENS.GRAD.PROCTOR.CAT825.
983	Y		SOURCE-NOT SPECIFIC. DENS.GRAD.PROCTOR. CAT825.
992	Y		SOURCE-FINE GRAINED STOCKPILE AREA. DENS.GRAD.PROCTOR.CAT825
1000	Y		SOURCE-NOT SPECIFIC. DENS.GRAD.PROCTOR. CAT825
1004	Y		SOURCE-RIGHT,ABOVE FINE GRAINED STOCKPILE AREA. DENS.GRAD.PROCTOR. CAT825
1011	N	OLM	SOURCE-ABOVE,RIGHT OF FINE GRAINED STOCKPILE. DENS.GRAD.PROCTOR. CAT825
1015	Y		SOURCE- ADJACENT TO OLD HIGHWAY SECTION LINE 7 & 8. DENS.GRAD.PROCTOR. CAT825.
1021	Y		SOURCE-ABOVE,RIGHT OF OLD HIGHWAY. DENS.GRAD. CAT825.
1022	Y		SOURCE-FINE GRAINED STOCKPILE AREA. DENS.GRAD.PROCTOR.CAT825.
1031	Y		SOURCE-FINE GRAINED STOCKPILE AREA. DENS.GRAD.PROCTOR.CAT825
1042	Y		SOURCE-FINE GRAINED STOCKPILE AREA. DENS.GRAD.PROCTOR.CAT825
1048	N	OLD	SOURCE-BELOW OLD HIGHWAY 65. DENS.GRAD.PROCTOR. CAT825.
1053	Y		SOURCE-BELOW OLD HIGHWAY,SECTION 4 & 5. DENS.GRAD.PROCTOR.CAT825.
1057	Y		SOURCE-COARSE GRAINED STOCKPILE. DENS.GRAD.PROCTOR. CAT825
1063	Y		SOURCE-COARSE GRAINED STOCKPILE. DENS.GRAD.PROCTOR.CAT825
1072	N	OLM	SOURCE-FINE GRAINED STOCKPILE AREA. DENS.GRAD.PROCTOR.CAT 825.
1075	Y		SOURCE-COARSE GRAINED STOCKPILE. DENS.GRAD.PROCTOR.CAT 825.
1079	Y		SOURCE-NOT SPECIFIC. DENS.GRAD.PROCTOR. CAT825
1082	Y		SOURCE-VICINITY OF OLD HIGHWAY,SECTION 4 & 5. DENS.GRAD.PROCTOR. CAT825.
1086	Y		SOURCE-FINE GRAINED STOCKPILE AREA. DENS.GRAD.PROCTOR.CAT825.
1089	N	OLM	SOURCE-SECT. 7&8. DENS.GRAD.PROCTOR. SPF60.
1097	N	OLM	SOURCE-FINE GRAINED STOCKPILE AREA. DENS.GRAD.PROCTOR.CAT 825.
1107	Y		SOURCE-NOT STATED. DENS.GRAD.PROCTOR. CAT825.
1110	N	OLM	SOURCE-BELOW OLD HIGHWAY,SECT. 6&7. DENS.GRAD.PROCTOR.CAT 825.
1121	N	OLD	SOURCE-COARSE GRAINED STOCKPILE. DENS.GRAD.PROCTOR.CAT825.
1123	Y		SOURCE-FINE GRAINED STOCKPILE AREA. DENS.GRAD.PROCTOR.CAT 825
1132	N	OLM	SOURCE-FINE GRAINED STOCKPILE AREA. DENS.GRAD.PROCTOR.CAT 825.
1138	Y		SOURCE-NOT STATED. DENS.GRAD.PROCTOR. CAT 825.TEST IN HAUL ROAD NEAR THE RIGHT ABUTMENT
1142	Y		SOURCE-NOT STATED. DENS.GRAD.PROCTOR. CAT 825.
1151	Y		SOURCE-NOT STATED. DENS.GRAD.PROCTOR. CAT825.
1186	Y		SOURCE-NOT STATED. DENS.GRAD.PROCTOR. CAT825.
1190	Y		SOURCE-NOT STATED. DENS.GRAD.PROCTOR. CAT825.
1192	Y		SOURCE-NOT STATED. DENS.GRAD.PROCTOR. CAT825.
1240	Y		SOURCE-NOT STATED. DENS.GRAD.PROCTOR. FIELD DENSITY IN THE HAUL ROAD. CAT825.
1241	Y		SOURCE-SECTION 6. DENS.GRAD.PROCTOR. CAT825.
1247	Y		SOURCE-NOT STATED. DENS.GRAD.PROCTOR. CAT825.
1254	N	OLM	SOURCE-UPPER BENCH. DENS.GRAD.PROCTOR.
1257	Y		SOURCE-NOT STATED. DENS.GRAD.PROCTOR.
1260	N	OLM	SOURCE-NOT STATED. DENS.GRAD.PROCTOR. CAT825. FIELD DENSITY FROM 1260A. AREA RETESTED, SEE 1260A.
1268	Y		SOURCE-NOT STATED. DENS.GRAD.PROCTOR. CAT825. FIELD DENSITY LOCATION CORRECTED. SEE RETEST 1268A.
1272	Y		SOURCE-SECTION 6,7 & 8. DENS.GRAD.PROCTOR. CAT825.
1277	Y		SOURCE-STOCKPILE,UPSTREAM TOE. DENS.GRAD.PROCTOR. CAT825
1298	Y		SOURCE-RI STOCKPILE RA. DENS.GRAD.PROCTOR. CAT825.
1299	Y		SOURCE-SPILLWAY CUT. DENS.GRAD.PROCTOR. CAT825.
1302	Y		SOURCE-NOT STATED. DENS.GRAD.PROCTOR.

TEST NUMBER	TEST IN SPEC	STATUS FAILED TESTS	TEST COMMENTS
1305	Y		SOURCE-NOT STATED. DENS.GRAD.PROCTOR. CAT825.
1313	Y		SOURCE-RI STOCKPILE,RA/US. DENS.GRAD.PROCTOR. CAT825.
1315	Y		SOURCE-ABOVE SMALL KOLMAN. DENS.GRAD.PROCTOR. CAT825.
1325	Y		SOURCE-NOT STATED. DENS.GRAD.PROCTOR.
1326	Y		SOURCE-NOT STATED. DENS.GRAD.PROCTOR.
1331	Y		SOURCE-NOT STATED. DENS.GRAD.PROCTOR.
1333	Y		SOURCE-NOT STATED. DENS.GRAD.PROCTOR.
1336	Y		SOURCE-NOT STATED. DENS.GRAD.PROCTOR. CAT825.
1337	N	OLM	SOURCE-NOT STATED. DENS.GRAD.PROCTOR. MC AND COMPACTION ARE INCONSISTENT ACROSS THE LIFT. SEE ALSO 1337A & 1347.
1346	Y		SOURCE-NOT STATED. DENS.GRAD.PROCTOR. CAT825.
1337A	Y		SOURCE-SPILLWAY EXCAVATION. DENS.GRAD.PROCTOR. CAT825.RETEST OF 1337, NOT REWORKED. MC ACROSS LIFT IS VARIABLE.
1348	N	OLM	SOURCE-STOCKPILE BY SHOP. DENS.GRAD.PROCTOR. SPF60.
1352	Y		SOURCE-NOT STATED. DENS.GRAD.PROCTOR. CAT825.
1361	Y		SOURCE-SPILLWAY EXCAVATION. DENS.GRAD.PROCTOR. CAT825.
1364	Y		SOURCE-NOT STATED. DENS.GRAD.PROCTOR. CAT825.
1366	Y		SOURCE-SPILLWAY EXCAVATION. DENS.GRAD.PROCTOR. CAT825.
1369	N	OLM	SOURCE-SPILLWAY EXCAVATION. DENS.GRAD.PROCTOR. CAT825.
1374	Y		SOURCE-SPILLWAY CUT. DENS GRAD.PROCTOR. CAT825.
1378	Y		SOURCE-NOT STATED. DENS.GRAD.PROCTOR. CAT825.
1390	N	OLM	SOURCE-SPILLWAY EXCAVATION. DENS.GRAD.PROCTOR. CAT825.
1397	N	OLM	SOURCE-SPILLWAY CUT. DENS.GRAD.PROCTOR. CAT825.
1399	N	RW,RT	SOURCE-SPILLWAY EXCAVATION. DENS.GRAD.PROCTOR. CAT825.
1347	Y		SOURCE-SPILLWAY CUT. DENS.GRAD.PROCTOR.RETEST OF SAME LIFT AS 1337 & 1337A. MC ACROSS THE LIFT IS VARIABLE.
1399A	N	OLM	SOURCE-SPILLWAY CUT. DENS.GRAD.PROCTOR. REWORKED AREA,SEE ALSO 1399,1402,1403.
1412	Y		SOURCE-NOT STATED. DENS.GRAD.PROCTOR. CAT825.
1418	Y		SOURCE-NOT STATED. DENS.GRAD.PROCTOR. CAT825.
1421	N	OLM	SOURCE-NOT STATED. DENS.GRAD.PROCTOR. CAT825.
1425	Y		SOURCE-NOT STATED. DENS.GRAD.PROCTOR. CAT825.INTERFACE AT RI TO DII.
1427	N	OLM	SOURCE-SECTION 7,OLDER ALLUVIUM. DENS.GRAD.PROCTOR. CAT825.
1451	Y		SOURCE-NOT STATED. DENS.GRAD.PROCTOR.
1461	Y		SOURCE-STA. 44 TO 45,LEFT OF BASELINE. DENS.GRAD.PROCTOR.CAT825.
1466	Y		SOURCE-NOT STATED. DENS.GRAD.PROCTOR. CAT825.
1473	Y		SOURCE-NOT STATED. DENS.GRAD.PROCTOR. CAT825.
1475	Y		SOURCE-STA. 45 TO 4750,0 TO 200 LFT. DENS.GRAD.PROCTOR.CAT825.
1484	Y		SOURCE-STA. 40 TO 45,LEFT. DENS.GRAD.PROCTOR. CAT825.
1492	Y		SOURCE-STA. 45,LEFT. DENS.GRAD.PROCTOR. CAT825.
1494	Y		SOURCE-STA. 48,LEFT. DENS.GRAD.PROCTOR. CAT825.
1497	Y		SOURCE-NOT STATED. DENS.GRAD.PROCTOR. CAT825.
1501	N	OLM	SOURCE-STA. 43 TO 45, 300 TO 500 LEFT. DENS.GRAD.PROCTOR.CAT825.
1508	Y		SOURCE-STA.55 TO 62,ALONG BASELINE. DENS.GRAD.PROCTOR.CAT825.
1558	Y		SOURCE-NA. DENS GRAD.PROCTOR. SPRING START UP RESTORATION. AREA 1340 TO 2050,-50 TO -82.
1564	Y		SOURCE-NA. DENS.GRAD.PROCTOR. SPRING START UP RESTORATION. AREA 1800 TO 2000,-145 TO -210.
1572	N	RW,RT	SOURCE-NA. DENS.GRAD.PROCTOR. AREA 1380 TO 2050,-190 TO -250. AREA REWORKED&RETESTED. POOR LIFT BONDING.
1575	N	OLM	SOURCE-NA. DENS.GRAD.PROCTOR. AREA 1400 TO 2050,-240 TO-300.
1572A	Y		SOURCE-NA. DENSITY ONLY RETEST OF 1572. GRADATION FROM 1572.
1587	Y		SOURCE-IC EXCAVATION. DENS.GRAD.PROCTOR. AREA 1350 TO 2050,-150 TO -300. AREA SUSPECT WRT MC.
1601	Y		SOURCE-IC & RBA BLEND. DENS.GRAD.PROCTOR. AREA 1350 TO 2000,-200 TO DS TOE.
1603	Y		SOURCE-IC & RA CUT. DENS.GRAD.PROCTOR. AREA 1350 TO 2050,-80 TO -200.
1607	Y		SOURCE-IC & RBA BLEND. DENS.GRAD.PROCTOR. AREA 1350 TO 2050, -355 TO DS TOE.
1610	Y		SOURCE-IC & RBA BLEND. DENS.GRAD.PROCTOR. AREA CHIMNEY TO -80,1300 TO 2100.
1640	Y		SOURCE-UNKNOWN BLEND. DENS.GRAD.PROCTOR. AREA 1825 TO 1875,325 TO 375. A PATCH.
1642	Y		SOURCE-RBA 5700,400 RT. DENS.GRAD.PROCTOR. AREA 2025 TO 2175,-150 TO -275.

TEST NUMBER	TEST IN SPEC	STATUS FAILED TESTS	TEST COMMENTS
1645	Y	RW,RT	SOURCE-UNKNOWN. DENS.GRAD.PROCTOR. AREA 1300 TO 1400,-200 TO -300. CONTRACTOR DECIDED TO REWORK.
1654	Y		SOURCE-RBA 5400,-400 LEFT. DENS.GRAD.PROCTOR. AREA 1300 TO 2200,-40 TO -80.
1661	Y		SOURCE-RBA 3900 TO 4500,100 TO 200 RT. DENS.GRAD.PROCTOR.AREA 2000 TO 2230, -100 TO -330.
1663	Y		SOURCE-RBA 4900 TO 4500,150 RT. DENS.GRAD.PROCTOR. AREA 2050 TO RA,CHIMNEY TO -380.
1645A	Y		SOURCE-SAME. DENSITY ONLY. COMPARE TO 1645.RETEST OF REWORKED AREA.
1672	N	OLM	SOURCE-RBA 5900 TO 6000,350 RT. DENS.GRAD.PROCTOR. AREA 1450 TO 2000,-50 TO -275.
1678	Y		SOURCE-RBA 4100 TO 3700,300 LFT. DENS GRAD.PROCTOR. AREA 1750 TO 2125,-28 TO -320.
1680	Y		SOURCE-RBA 3500 TO 4000,150 RT. DENS.GRAD.PROCTOR. AREA 1300 TO 2250,-50 TO -100.
1687	Y		SOURCE-RBA 3500 TO 4000,300 RT. DENS.GRAD.PROCTOR.AREA NOT STATED.
1694	N	OLM	SOURCE-RBA & ABUTMENT EX. DENS GRAD.PROCTOR. AREA 1350 TO 2150,-160 TO -330.
1700	Y		SOURCE-NOT SPECIFIC. DENS.GRAD.PROCTOR. AREA 1350 TO 2150,-100 TO -200.
1702	Y		SOURCE-RBA 3400 TO 3800,100 RT. DENS.GRAD.PROCTOR.AREA 1300 TO 1850,-350 TO -425.
1703	Y		SOURCE-RBA NOT SPECIFIC. DENS.GRAD.PROCTOR. AREA 1300 TO 2150,CHIMNEY TO -100.
1707	Y		SOURCE-RBA NOT SPECIFIC. DENS.GRAD.PROCTOR. AREA LA TO 2050,-300 TO D/S EDGE.
1712	Y		SOURCE-RBA NOT STATED. DENS.GRAD.PROCTOR. AREA LA TO 2175,CHIMNEY TO -280.
1715	Y		SOURCE-RBA 3300 TO 4000. DENS.GRAD.PROCTOR. AREA 1600 TO 2100,-200 TO -250.
1716	Y		SOURCE-RBA 3500 TO 3800,500 TO 600 LFT. DENS.GRAD.PROCTOR. AREA NOT SPECIFIC.
1721	Y		SOURCE-RBA 3700 TO 4200, 750 RT. DENS.GRAD.PROCTOR. AREA 1550 TO 1800,-150 TO -200.
1723	Y		SOURCE-RBA 4700 TO 5000,700 LFT. DENS.GRAD.PROCTOR. AREA 1300 TO 2160,-150 TO -350.
1726	Y		SOURCE-RBA 3600 TO 4300,750 RT. DENS.GRAD.PROCTOR. AREA 1550 TO 1800,-40 TO -100.
1728	Y		SOURCE-RBA 5200,700 LFT & 3100,200 RT. DENS.GRAD.PROCTOR.AREA -110 TO -420.
1730	Y		SOURCE-RBA 5100 TO 5400,400 LFT & 3800 TO 4000,-50.DENS.GRAD.PROCTOR. AREA 1800,-300 MOUND TIE IN.
1732	Y		SOURCE-RBA 4400 TO 4700,450 LFT. DENS.GRAD.PROCTOR.
1734	Y		SOURCE-RBA 4400 TO 4700,450 LFT. DENS.GRAD.PROCTOR. AREA 1350 TO 1550,-170 TO -240.
1736	Y		SOURCE-RBA. DENS.GRAD.PROCTOR.
1742	Y		SOURCE-RBA 4100 TO 4900, 300 LFT. DENS.GRAD.PROCTOR. AREA 1550 TO ,-110 TO -200.
1750	Y		SOURCE-RBA. DENS.GRAD.PROCTOR. AREA LA TO 1450, -150 TO-200.
1752	N	OLD	SOURCE-RBA 5300 TO 5500,450 RT. DENS.GRAD.PROCTOR. AREA 1800 TO 2050,-280 TO -320.
1756	Y		SOURCE-RBA. DENS.GRAD.PROC. AREA CHIMNEY TO -250.
1759	Y		SOURCE-RBA 4400 TO 4700,350 LFT. DENS.GRAD.PROC. AREA 2050 TO 2250,-200 TO -300.
1762	Y		SOURCE-RBA 3300 TO 3700,400 LFT. DENS.GRAD.PROC. AREA 1500 TO 1700,-200 TO -300.
1764	Y		SOURCE-RBA 3000 TO 3800,-400 TO -500 LFT. DENS.GRAD.PROC. AREA LA TO 1900, -180 TO D/S EDGE.
1767	Y		SOURCE-RBA 3000 TO 3700,400 LFT. DENS.GRAD.PROC. AREA LA TO 1550, CHIMNEY TO -200.
1768	N	OLM	SOURCE-RBA 3000 TO 3700,400 LFT. DENS.GRAD.PROC. AREA LA TO 2050,-40 TO -140.
1772	Y		SOURCE-RBA 4500 TO 5000,0 TO 250 RT. DENS.GRAD.PROC. AREA NOT STATED.
1776	Y		SOURCE-RBA 4500 TO 5000,0 TO 250 LFT. DENS.GRAD.PROC. AREA 2200 TO 2250, CHIMNEY TO -350.
1780	Y		SOURCE-RBA 4500 TO 5050, 0 TO 250 LFT. DENS.GRAD.PROC. AREA LA TO 1950,-40 TO -200.
1782	Y		SOURCE-RBA 4500 TO 5000, 0 TO 250 LFT. DENS.GRAD.PROC. AREA 1300 TO 1900,-40 TO -100.
1786	N	OLM	SOURCE-RBA 4500 TO 5000, 0 TO 250 LFT & 2900 TO 3100,650 LFT. DENS GRAD PROC. AREA RA TO 1950,CHIMNEY TO EDGE.
1787	Y		SOURCE-RBA 4500 TO 5050,0 TO 250 LFT. DENS.GRAD.PROC. AREA LA TO 1900,CHIMNEY TO -250.
1791	N	OLM	SOURCE-RBA 2500 TO 3000,200 LFT. DENS.GRAD.PROC. AREA 1900 TO RA,-100 TO -200.
1792	Y		SOURCE-RBA 2500 TO 3000,300 LFT. DENS.GRAD.PROC. AREA 1350 TO 1550,-100 TO -200.
1796	N	OLM	SOURCE-RBA 2500 TO 3000,0 TO 300 LFT. DENS.GRAD.PROC. AREA LA TO 1900,CHIMNEY TO EDGE.
1798	N	OLM	SOURCE-RBA 4500 TO 5050,0 TO 250 LFT. DENS.GRAD.PROC. AREA LA TO 1900,-90 TO EDGE.
1803	Y		SOURCE-RBA 4000 TO 4100,0 TO -100 RT. DENS.GRAD.PROC. AREA 2125 TO RA,-125 TO -375.
1817	Y		SOURCE-RBA 4000 TO 4100,0 TO 100 RT. DENS.GRAD.PROC. AREA LA TO 2050,-250 TO -375.
1819	Y		SOURCE-RBA 4100 TO 4700,0 TO 100 LFT. DENS.GRAD.PROC. AREA 1800 TO 2100,-40 TO -100.
1821	Y		SOURCE-RBA 4100 TO 4700,0 TO 100 LFT. DENS.GRAD.PROC. AREA RA TO 2100,0 TO 100 LFT.
1825	Y		SOURCE-RBA 6000 TO 6500,0 TO 200 LFT. DENS.GRAD.PROC. AREA 1650 TO 2050,-200 TO -300.
1830	Y		SOURCE-RBA 4500 TO 4800,0 TO 100 LFT. DENS.GRAD.PROC. AREA CHIMNEY TO TOE.
1836	Y		SOURCE-RBA. 3000 TO 4500,0 TO 200 LFT. DENS.GRAD.PROC.AREA NOT STATED.
1840	Y		SOURCE-RBA 6000 TO 6500,200 LFT. DENS.GRAD.PROC. AREA 1500 TO 1800,-200 TO TOE.

TEST NUMBER	TEST IN SPEC	STATUS FAILED TESTS	TEST COMMENTS
1847	Y		SOURCE-RBA 4000 TO 5000,0 TO 200 LFT. DENS.GRAD.PROC. AREA 1225 TO 2230,CHIMNEY TO -110.
1850	Y		SOURCE-RBA. DENS.GRAD.PROC.
1852	Y		SOURCE-RBA. DENS.GRAD.PROC.
1854	Y		SOURCE-RBA 5700,100 TO 300 LFT. DENS.GRAD.PROC. AREA 1275 TO 1600,-180 TO -350.
1856	N		SOURCE-RBA 3800 TO 4000,100 TO 200 LFT. DENS.GRAD.PROC.AREA LA TO 2225,-100 TO -200.
1862	Y		SOURCE-RBA. DENS.GRAD.PROC. AREA 1200 TO 2200,-300 TO -350 & 1550 TO 2200,-40 TO -275.
1866	Y		SOURCE-RBA 3400 TO 3700,500 LFT. DENS.GRAD.PROC. AREA LA TO 2250,-40 TO -300.
1869	Y		SOURCE-RBA 3500 TO 3900,500 LFT. DENS.GRAD.PROC. AREA LA TO 2200,-280 TO -350.
1871	Y		SOURCE-RBA 3500 TO 3900,500 LFT. DENS.GRAD.PROC. AREA LA TO 2200, -40 TO -350.
1872	Y		SOURCE-RBA 3000 TO 4000,100 RT. DENS.GRAD.PROC. AREA 1250 TO 2200,-150 TO -250.
1879	Y		SOURCE-RBA 3700 TO 3900,900 RT. DENS.GRAD.PROC. AREA LA TO 2320.
1881	Y		SOURCE.RBA 3700 TO 3900,900 RT. DENS.GRAD.PROC. AREA 1235 TO 2150,-36 TO -75.
1887	Y		SOURCE-RBA 3700 TO 3900,900 RT. DENS.GRAD.PROC. AREA LA TO 2150,-80 TO -250.
1888	Y		SOURCE-RBA. DENS.GRAD.PROC. AREA 1300 TO 2300,-118 TO -250.
1896	Y		SOURCE-RBA 3700 TO 3900,900 RT. DENS.GRAD.PROC. AREA 1225 TO 2300, CHIMNEY TO -180.
1899	Y		SOURCE-RBA. DENS.GRAD.PROC. AREA 1300 TO 2300,-270 TO -334.
1906	Y		SOURCE-RBA 3100 TO 3600,100 & 600 LFT. DENS.GRAD.PROC. AREA LA TO RA,CHIMNEY TO -150.
1909	Y		SOURCE-RBA 5600,300 LFT. DENS.GRAD.PROC. AREA 2170 TO 2425, CHIMNEY TO -330.
1912	Y		SOURCE-RBA 3500,300 LFT. DENS.GRAD.PROC. AREA LA TO 2150,-120 TO-325.
1918	N	OLM	SOURCE-RBA 3800 TO 4200,900 RT. DENS.GRAD.PROC. AREA 1225 TO 2160,CHIMNEY TO -210.
1921	Y		SOURCE-RBA 3500,300 LFT. DENS.GRAD.PROC. AREA LA TO 2150,-200 TO -334.
1932	Y		SOURCE-RBA 4500 TO 4700,150 LEFT. DENS.GRAD.PROC. AREA 1350 TO 1800,-275 TO -300.
1934	Y		SOURCE-RBA 3800 TO 4500,750 RT. DENS.GRAD.PROC. AREA 1400 TO ,-40 TO -80.
1938	N		SOURCE-NOT STATED. DENS.GRAD.PROC. AREA NOT STATED.
1943	Y		SOURCE-RBA 3200 TO 4100,450 TO 600 LFT. DENS.GRAD.PROC.AREA NOT STATED.
1947	N	OLM	SOURCE-RBA 3800 TO 4500,900 RT. DENS.GRAD.PROC. AREA NOT STATED.
1952	N	OLM	SOURCE-RBA 3800 TO 4500,900 RT. DENS.GRAD.PROC. AREA NOT STATED.
1957	Y		SOURCE-RBA NOT STATED. DENS.GRAD.PROC. AREA NOT STATED.
1959	Y		SOURCE-RBA 2200 TO 2400,600 LFT. DENS.GRAD.PROC. AREA NOT STATED.
1965	Y		SOURCE-RBA 2200 TO 3000,150 LFT. DENS.GRAD.PROC. AREA NOT STATED.
1968	Y		SOURCE-RBA 5300 TO 5700,400 LFT. DENS.GRAD.PROC. AREA NOT STATED.
1971	Y		SOURCE-RBA 2200 TO 3000,400 LFT. DENS.GRAD.PROC. AREA NOT STATED.
1974	Y		SOURCE-NOT STATED. DENS.GRAD.PROC. AREA NOT STATED.
1978	Y		SOURCE-RBA 5500 TO 5800,50 TO 150 RT. DENS.GRAD.PROC. AREA NOT STATED.
1980	Y		SOURCE-RBA 3300,250 RT. DENS.GRAD.PROC. AREA NOT STATED.
1985	Y		SOURCE-RBA 7000 TO 7500,250 LFT. DENS.GRAD.PROC. AREA NOT STATED.
1988	Y		SOURCE-RBA 2400 TO 2700,600 LFT. DENS.GRAD.PROC. AREA NOT STATED.
1989	Y		SOURCE-RBA 2300 TO 2700,600 LFT. DENS.GRAD.PROC. AREA NOT STATED.
1992	Y		SOURCE-RBA 2300 TO 2700,600 LFT. DENS.GRAD.PROC. AREA NOT STATED.
1994	Y		SOURCE-RBA 2800 TO 2900,100 TO 300 RT. DENS.GRAD.PROC. AREA NOT STATED.
2003	Y		SOURCE-RBA 2600 TO 3200,50 TO 450 LFT. DENS.GRAD.PROC. AREA NOT STATED.
2005	Y		SOURCE-RBA. DENS.GRAD.PROC. FILLET D/S LA.
2008	N	OLM	SOURCE-RBA 25 TO 30 0 TO 400 RT. DENS.GRAD.PROC. 12 TO 2330,-175 TO -250.RETEST OF TEST 2006 AREA. NOT REWORKED.
2010	Y		SOURCE-RBA 2500 TO 3000,0 TO 400 RT. DENS.GRAD.PROC. AREA NOT STATED.
2014	Y		SOURCE-RBA 2800 TO 3200,200 LFT. DENS.GRAD.PROC. AREA NOT STATED.
2017	Y		SOURCE-RBA 2500 TO 3000,0 TO 400 RT. DENS.GRAD.PROC. AREA NOT STATED.
2021	Y		SOURCE-RBA 2900 TO 3200. DENS.GRAD.PROC. AREA NOT STATED.
2027	Y		SOURCE-RBA 5700 TO 6000,400 TO 500 LFT. DENS.GRAD.PROC.AREA NOT STATED.
2032	Y		SOURCE-RBA 5700 TO 6000,400 TO 500 LFT. DENS.GRAD.PROC.
2037	Y		SOURCE-RBA 2600 TO 2900,0 TO 400 RT. DENS.GRAD.PROC. AREA NOT STATED.
2040	Y		SOURCE-RBA 2700 TO 3200,250 LFT. DENS.GRAD.PROC. AREA NOT STATED. LOW SPECIFIC GRAVITY.
2044	Y		SOURCE-RBA 3500 TO 4000,400 LFT. DENS.GRAD.PROC. AREA NOT STATED.

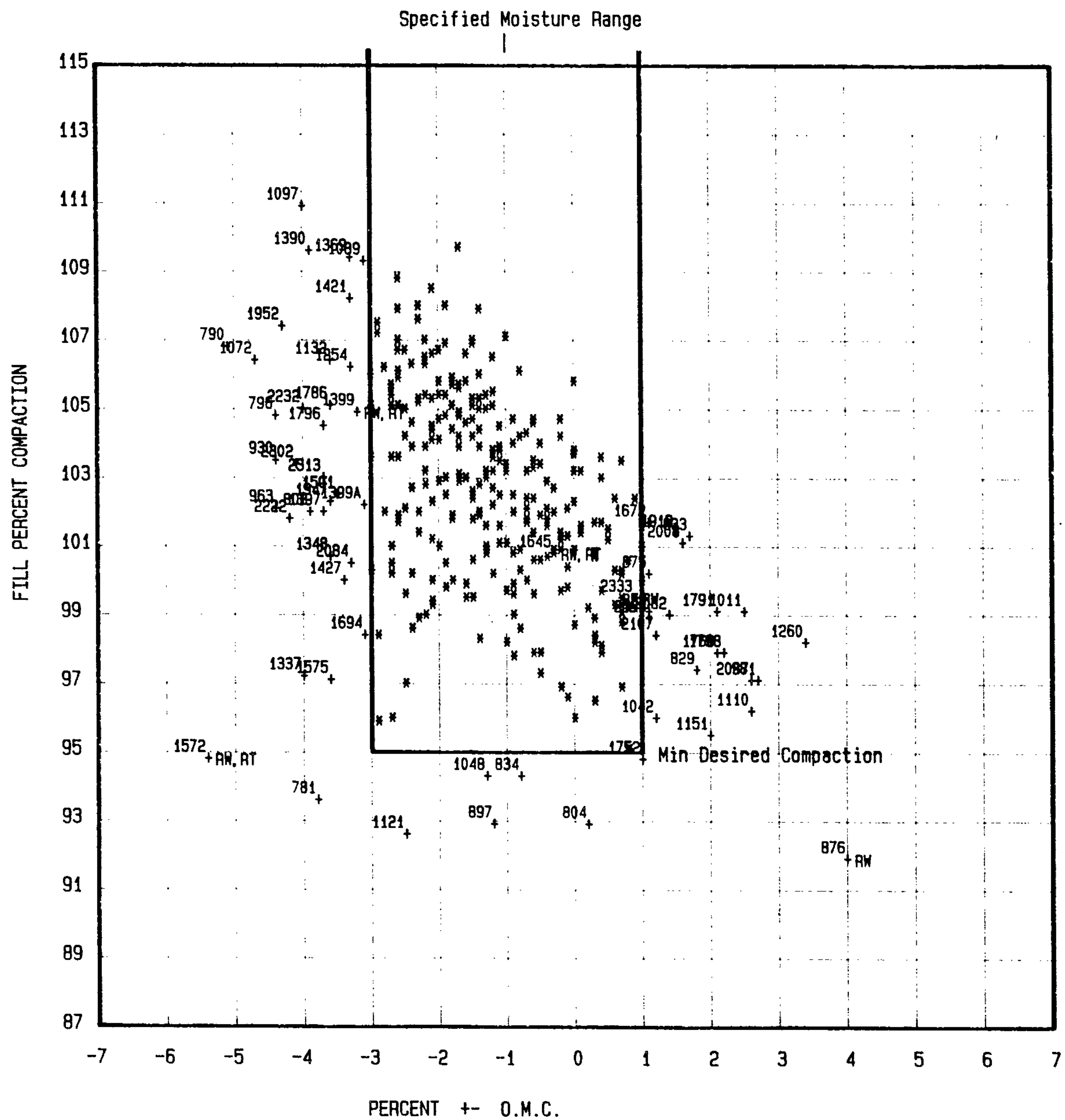
TEST NUMBER	TEST IN SPEC	STATUS FAILED TESTS	TEST COMMENTS
2046	Y		SOURCE-RBA 3500 TO 4000,400 LFT. DENS.GRAD.PROC. AREA NOT STATED.
2056	Y		SOURCE-RBA. DENS.GRAD.PROC. AREA NOT STATED.
2058	Y		SOURCE-RBA.. DENS.GRAD.PROC. AREA NOT STATED.
2061	Y		SOURCE-RBA 2600 TO 3000,100 RT & 3500 TO 4000,900 RT. DENS.GRAD.PROC. AREA NOT STATED.
2065	Y		SOURCE-RBA 3500 TO 4000,800 RT & 2600 TO 3000,100 LFT. DENS.GRAD.PROC. AREA NOT STATED.
2071	Y		SOURCE-RBA 2600 TO 3000,100 LFT. DENS.GRAD.PROC. AREA NOT STATED.
2077	Y		SOURCE-RBA 2600 TO 3000,200 LFT. DENS.GRAD.PROC. AREA NOT STATED.
2079	Y		SOURCE-RBA 2600 TO 3200,200 LFT. DENS.GRAD.PROC. AREA NOT STATED.
2082	N	OLM	SOURCE-RBA 2600 TO 3300,0 TO 200 LFT & 3500 TO 4000,900 RT. DENS.GRAD.PROC. AREA 12 TO 1850,-35 TO -250.
2084	N	OLM	SOURCE-RBA 2600 TO 3300,0 TO 100 LFT. DENS.GRAD.PROC. AREA NOT STATED.
2087	N	OLM	SOURCE-RBA. DENS.GRAD.PROC. AREA 1200 TO 1825,-180 TO -250.
2101	Y		SOURCE-RBA 3500 TO 4000,800 RT. DENS.GRAD.PROC. AREA NOT STATED.
2102	Y		SOURCE-RBA 2600 TO 3000,200 LFT. DENS.GRAD.PROC. AREA NOT STATED.
2107	N	OLM	SOURCE-RBA. DENS.GRAD.PROC. AREA 1200 TO 1950,-150 TO -240.
2110	Y		SOURCE-RBA. DENS.GRAD.PROC. AREA NOT STATED.
2113	Y		SOURCE-RBA 2600 TO 3300,200 LFT. DENS.GRAD.PROC. AREA NOT STATED.
2116	Y		SOURCE-RBA 3500 TO 4000,900 LFT. DENS.GRAD.PROC. AREA NOT STATED.
2119	Y		SOURCE-RBA 3500 TO 4000,800 LFT. DENS.GRAD.PROC. AREA NOT STATED.
2124	Y		SOURCE-RBA 2600 TO 3300,200 LFT. DENS.GRAD.PROC. AREA NOT STATED.
2125	Y		SOURCE-RBA. DENS.GRAD.PROC.
2131	Y		SOURCE-RBA 2500 TO 3000,300 RT & 5800 TO 6000,200 LFT. DENS.GRAD.PROC.
2132	Y		SOURCE-RBA 2600 TO 3300,300 LFT. DENS.GRAD.PROC.
2140	Y		SOURCE-RBA 2600 TO 3300,400 LFT. DENS.GRAD.PROC.
2144	Y		SOURCE-RBA 2600 TO 2700,100 TO 400 LFT & 3500 TO 4000,900 RT. DENS.GRAD.PROC.
2155	Y		SOURCE-RBA 2600 TO 3500,400 LFT & PEOA MIX. DENS.GRAD.PROC.
2157	Y		SOURCE-RBA. DENS.GRAD.PROC.
2176	Y		SOURCE-RBA. DENS.GRAD.PROC.
2180	Y		SOURCE-RBA 2700 TO 3300,400 LFT. DENS.GRAD.PROC.
2182	Y		SOURCE-RBA 2400 TO 2600 & 3700 400 LFT. DENS.GRAD.PROC.
2189	Y		SOURCE-RBA. DENS.GRAD.PROC.
2193	Y		SOURCE-RBA 2700 TO 3300,400 LFT. DENS.GRAD.PROC.
2197	Y		SOURCE-RBA 2700 TO 3300,400 LFT. DENS.GRAD.PROC.
2199	N	OLM	SOURCE-RBA 2300 TO 2400,300 TO 550 LFT. DENS.GRAD.PROC.AREA 1175 TO 1890,-40 TO -200.
2200	Y		SOURCE-RBA 2700 TO 3500,400 LFT. DENS.GRAD.PROC.
2203	Y		SOURCE-RBA 2600 TO 3300,400 LFT. DENS.GRAD.PROC.
2205	Y		SOURCE-RBA 2700 TO 3500,400 LFT. DENS.GRAD.PROC.
2209	Y		SOURCE-RBA 4300,200 TO 400 LFT. DENS.GRAD.PROC.
2218	Y		SOURCE-RBA. DENS.GRAD.PROC.
2222	N	OLM	SOURCE-RBA 2700 TO 3500,400 TO 500 LFT. DENS.GRAD.PROC.AREA 2100 TO 2350,-150 TO -185.
2224	Y		SOURCE-RBA 2500 TO 2700,300 TO 500 LFT. DENS.GRAD.PROC.
2228	Y		SOURCE-RBA. DENS.GRAD.PROC.
2229	Y		SOURCE-RBA 2400 TO 2500,150 TO 400 LFT. DENS.GRAD.PROC.
2232	N	OLM	SOURCE-RBA 2500 TO 2600,150 TO 400 LFT. DENS.GRAD.PROC.AREA 2100 TO 2300,-95 TO -175.
2235	N		SOURCE-RBA. DENS.GRAD.PROC.
2242	Y		SOURCE-RBA. DENS.GRAD.PROC.
2251	Y		SOURCE-RBA 2200 TO 2500,100 TO 400 LFT. DENS.GRAD.PROC.
2252	Y		SOURCE-RBA. DENS.GRAD.PROC.
2255	Y		SOURCE-RBA 2500 TO 3000,400 LFT. DENS.GRAD.PROC.
2258	Y		SOURCE-RBA. DENS.GRAD.PROC.
2261	Y		SOURCE-RBA 2100 TO 2500,100 TO 400 LFT. DENS.GRAD.PROC.
2262	Y		SOURCE-RBA 2200 TO 2400,100 TO 400 LFT. DENS.GRAD.PROC.
2275	Y		SOURCE-RBA. DENS.GRAD.PROC.

TEST NUMBER	TEST IN SPEC	STATUS FAILED TESTS	TEST COMMENTS
2279	Y		SOURCE-RBA 2600 TO 3000,400 LFT. DENS.GRAD.PROC.
2280	Y		SOURCE-RBA 2800 TO 3200,200 LFT. DENS.GRAD.PROC.
2288	Y		SOURCE-RBA 4700 TO 4900,300 RT. DENS.GRAD.PROC.
2292	Y		SOURCE-RBA 4600 TO 5100,600 LFT. DENS.GRAD.PROC.
2294	Y		SOURCE-RBA 2700 TO 3150,100 TO 200 RT. DENS.GRAD.PROC.
2301	Y		SOURCE- EXTENDED BORROW AREA 4600 TO 5100,600 LFT. DENS.GRAD.PROC.
2302	N	OLM	SOURCE-EXTENDED BORROW AREA 4600 TO 5100,600 LFT. DENS.GRAD.PROC. AREA 1125 TO 2350,-32 TO -125.
2305	Y		SOURCE-RBA 2500 TO 2600,200 LFT TO 100 RT. DENS.GRAD.PROC.
2307	Y		SOURCE-RBA. DENS.GRAD.PROC.
2310	Y		SOURCE-RBA. DENS.GRAD.PROC.
2313	N	OLM	SOURCE-RBA 2200 TO 2400,200 TO 400 LFT. DENS.GRAD.PROC.AREA 1300 TO 1550,-60 TO -100.
2316	Y		SOURCE-RBA 4600 TO 5100,600 LFT. DENS.GRAD.PROC.
2320	Y		SOURCE-RBA 4600 TO 5100,600 LFT. DENS.GRAD.PROC.
2322	Y		SOURCE-RBA. DENS.GRAD.PROC.
2330	Y		SOURCE-RBA 4600 TO 5100,400 TO 600 LFT. DENS.GRAD.PROC.
2333	Y	RW	SOURCE-RBA 2200 TO 2400,200 LFT TO 200 RT. DENS.GRAD.PROC.
2334	Y		SOURCE-RBA EXTENDED BORROW AREA. DENS.GRAD.PROC.
2339	Y		SOURCE-RBA 2200 TO 2500,200 TO 600 LFT. DENS.GRAD.PROC.
2350	Y		SOURCE-RBA. DENS.GRAD.PROC.
2351	Y		SOURCE-RBA 3800 TO 4200,700 LFT. DENS.GRAD.PROC.
2355	Y		SOURCE-RBA 4200 TO 4600,600 LFT. DENS.GRAD.PROC.
2358	Y		SOURCE-RBA 4200 TO 4600,600 LFT. DENS.GRAD.PROC.
2362	Y		SOURCE-RBA 4200 TO 4600,600 LFT. DENS.GRAD.PROC.
2370	Y		SOURCE-RBA 2250 TO 2500,300 LFT TO 150 RT. DENS.GRAD.PROC.
2372	Y		SOURCE-RBA KOCAL. DENS.GRAD.PROC.
2381	Y		SOURCE-RBA KOLMAN. DENS.GRAD.PROC.
2384	N		SOURCE-RBA KOLMAN & CRUSHER STOCKPILES. DENS.GRAD.PROC.

COMMENT: THIS REPORT COVERS THE ENTIRE CONSTRUCTION OF THE DAM.

LAB CHIEF: ____________________

SUBMITTED BY: ____________________
PROJECT ENGINEER

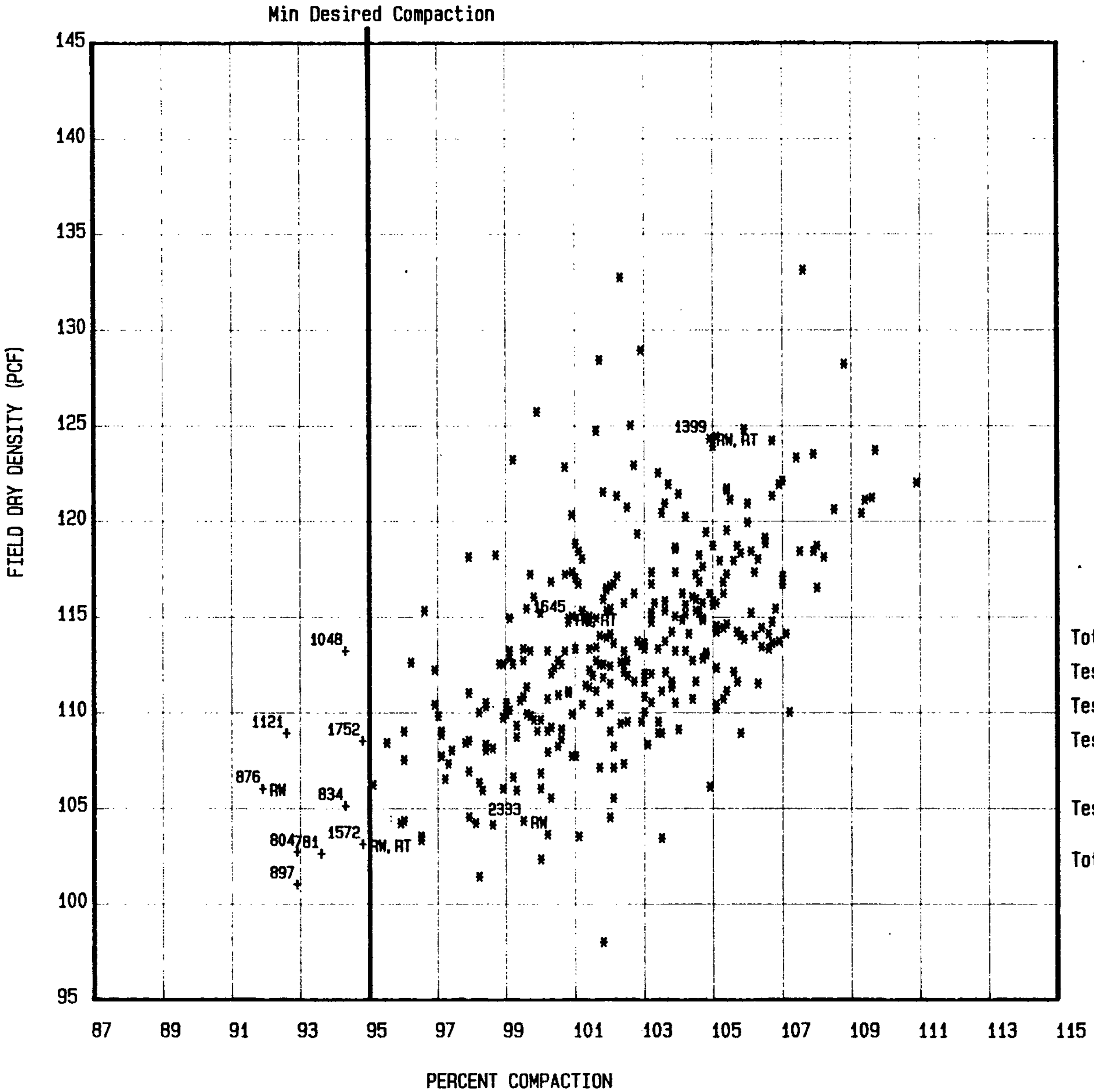


PROJECT: LITTLE DELL LAKE, DAM AND APP.
DISTRICT: CESPK
DATE OF REPORT : 12-07-1992
REPORT PERIOD : 01-01-90 thru 12-31-92
REPORT NUMBER : RI.4
TYPE OF MATERIAL: RANDOM I

LEGEND

* - Test within Specifications
+ - Test is out of Specification
RW - Test Location Reworked - No Retest
RW,RT - Test Location Reworked and Retested
RM - Test Location Removed

	All Tests to Date	Tests this Report
Total Number of Tests Locs.	325	325
Test Locations Reworked Only	2	2
Test Loc. Reworked and Retested	3	3
Test Locations Removed	0	0
Tests Outside Specifications in Permanent Fill		
Total Out of Spec.	55	55
Total Out on M.C.	48	48
Total Out on % Comp.	6	6
Total Out on M.C. and % Comp.	1	1

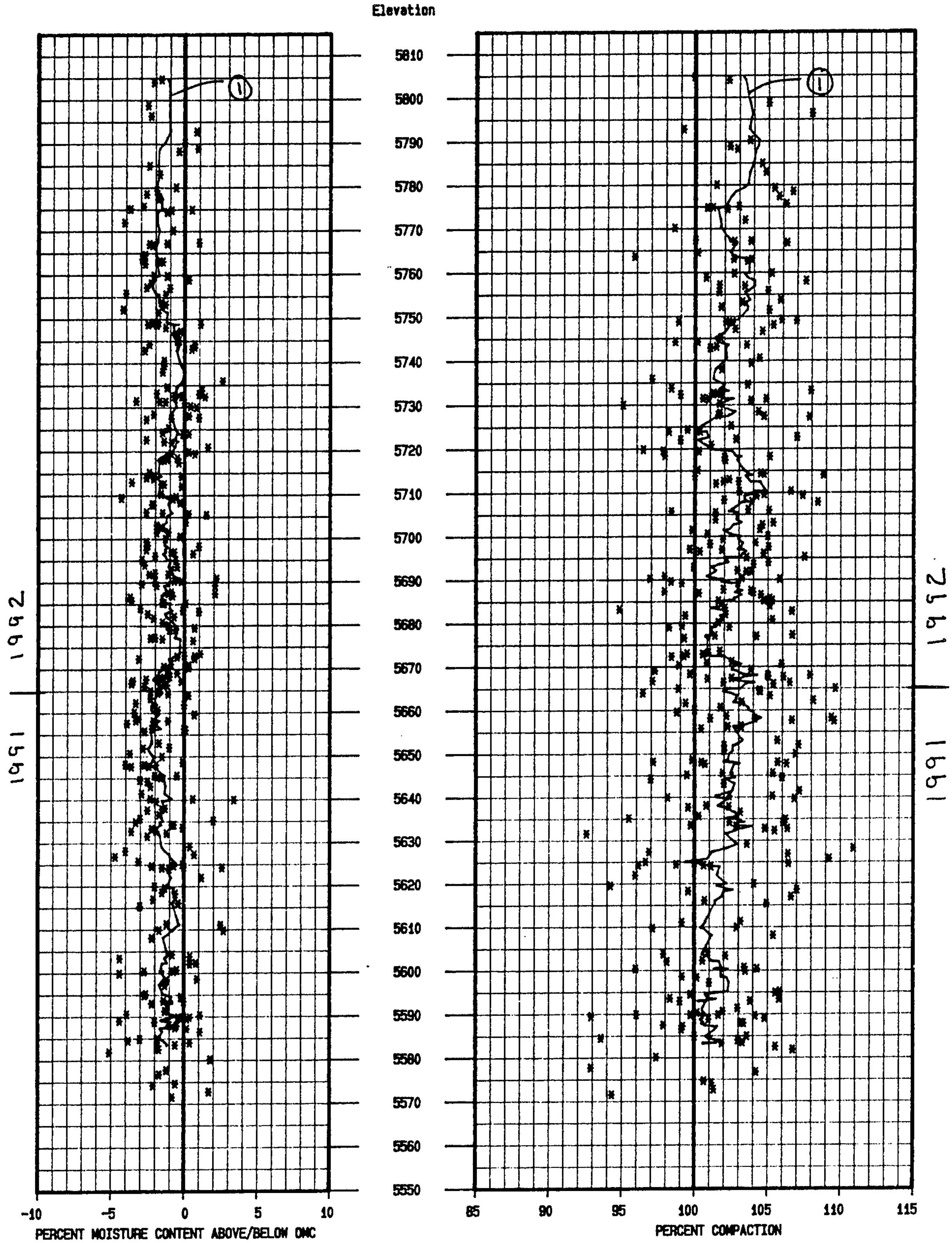


PROJECT: LITTLE DELL LAKE, DAM AND APP.
DISTRICT: CESPK
DATE OF REPORT : 12-07-1992
REPORT PERIOD : 01-01-90 thru 12-31-92
REPORT NUMBER : RI.5
TYPE OF MATERIAL: RANDOM I

LEGEND

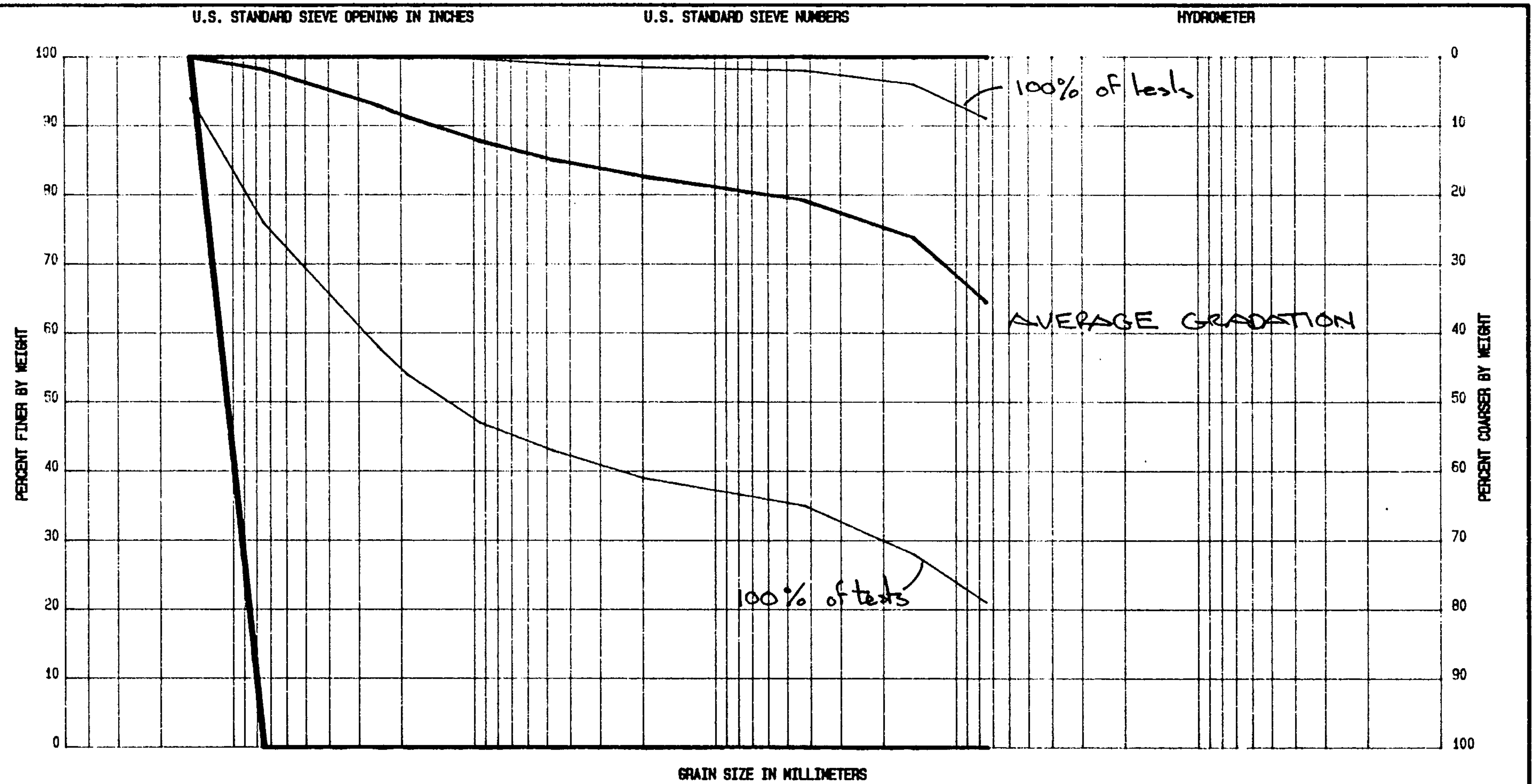
* - Test within Desired Limits
+ - Test is out of Desired Limits
RW - Test Location Reworked - No Retest
RW, RT - Test Location Reworked and Retested
RM - Test Location Removed

	All Tests to Date	Tests this Report
Total Number of Tests Locs.	325	325
Test Locations Reworked Only	2	2
Test Loc. Reworked and Retested	3	3
Test Locations Removed	0	0
Tests Below Desired Compaction Limits in Fill		
Total Out of % Comp.	7	7



① Curve represents a running average of 10 tests.

RANDOM I



Represents all test data

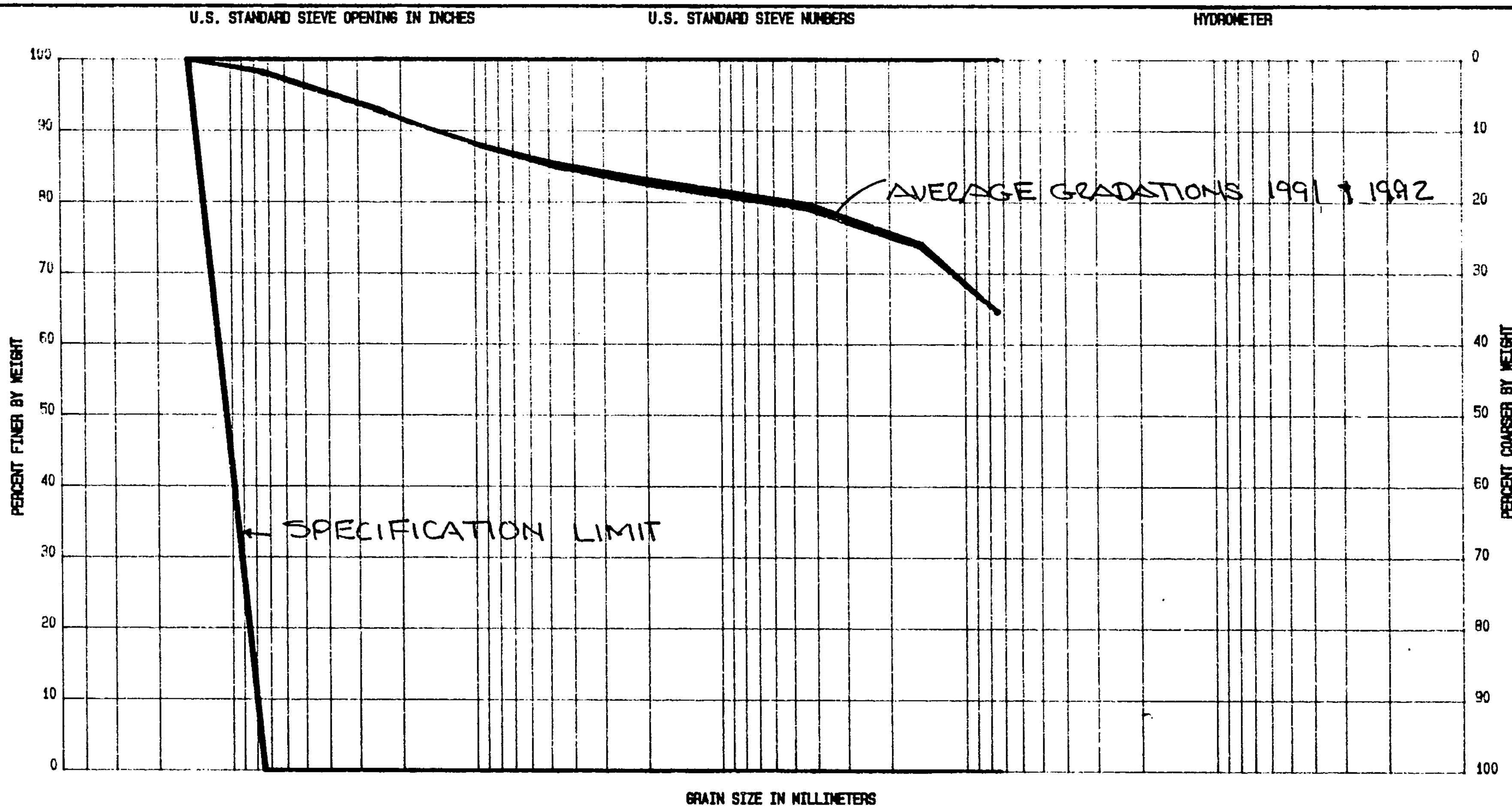
Project **LITTLE DELL DAM**

Area **RANDOM I**

Boring No.

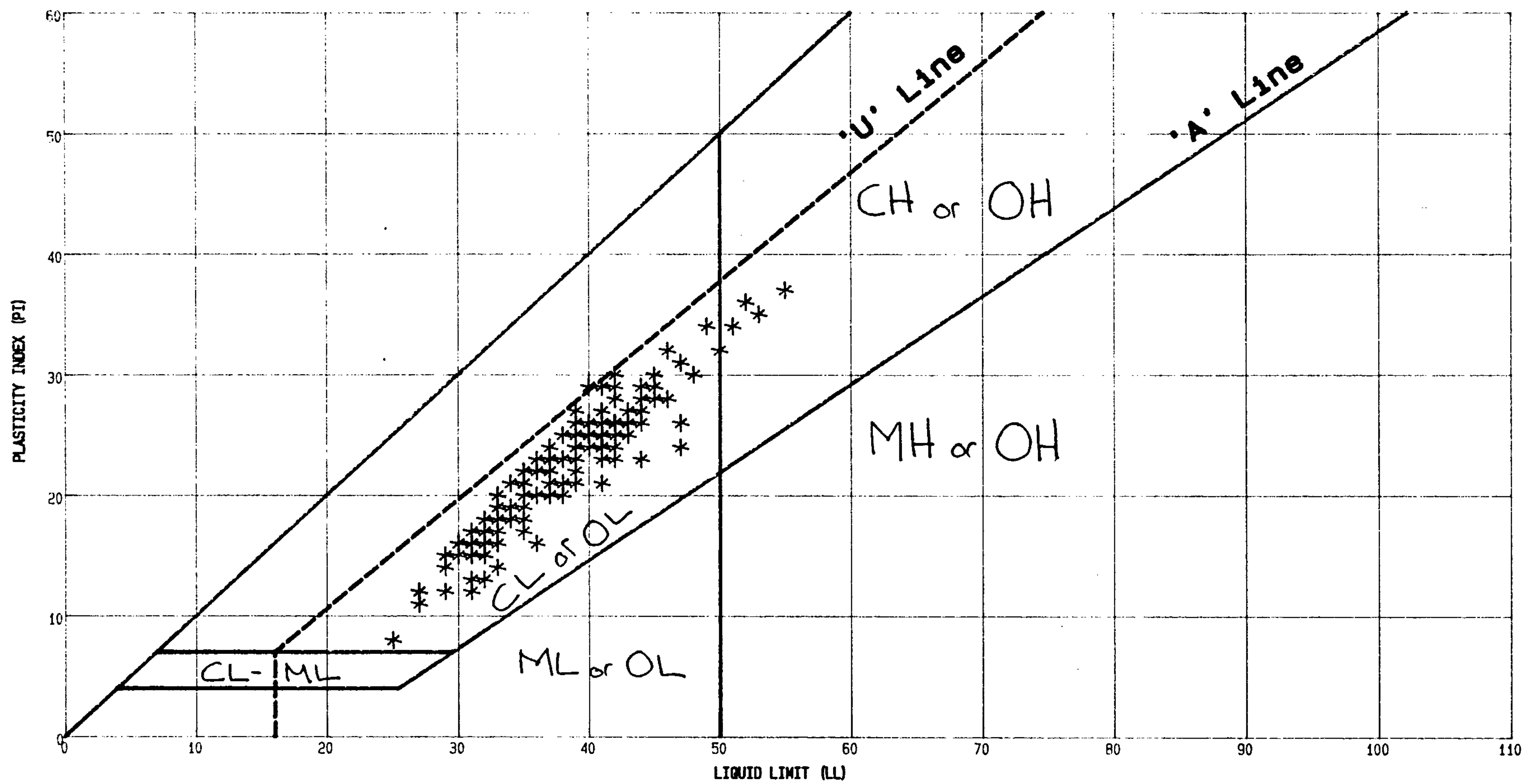
Date

GRADATION CURVES



Project	LITTLE DELL DAM
Area	RANDOM I
Boring No.	
Date	

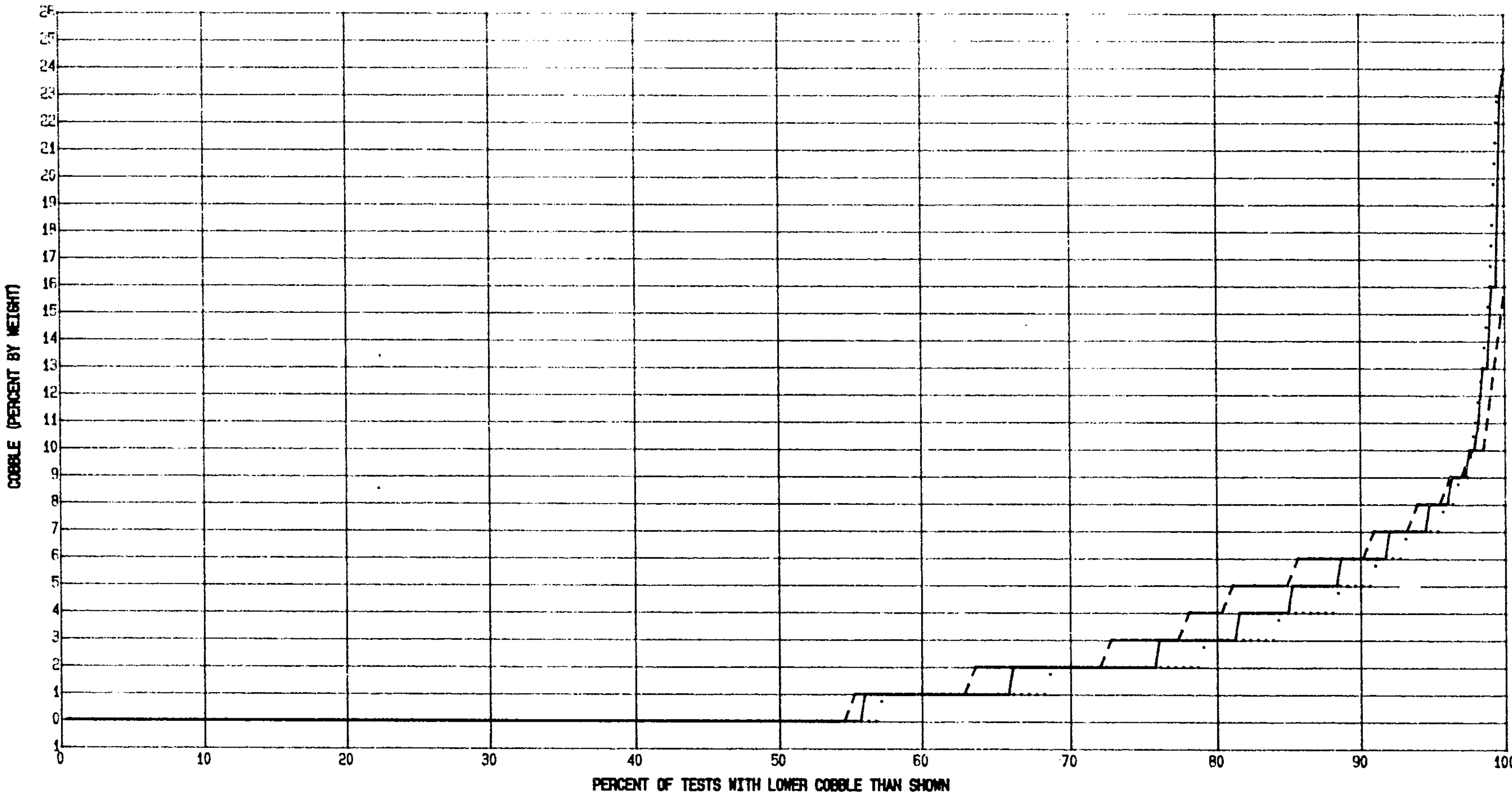
AVERAGE **GRADATION CURVES** BY YEAR



① Represents all test data for 1991 & 1992

Project	LITTLE DELL DAM
Area	RANDOM I
Boring No.	
Date	

PLASTICITY CHART



Line Style	From Date	To Date	# Points	Mean	Std Dev	10 %	Median	90 %
. . . . . .	01-01-92	12-31-92	192	1.713542	3.402528	0	0	5
— — — — —	01-01-91	12-31-91	132	1.992424	3.075379	0	0	6
———	01-01-90	12-31-92	325	1.830769	3.266786	0	0	6

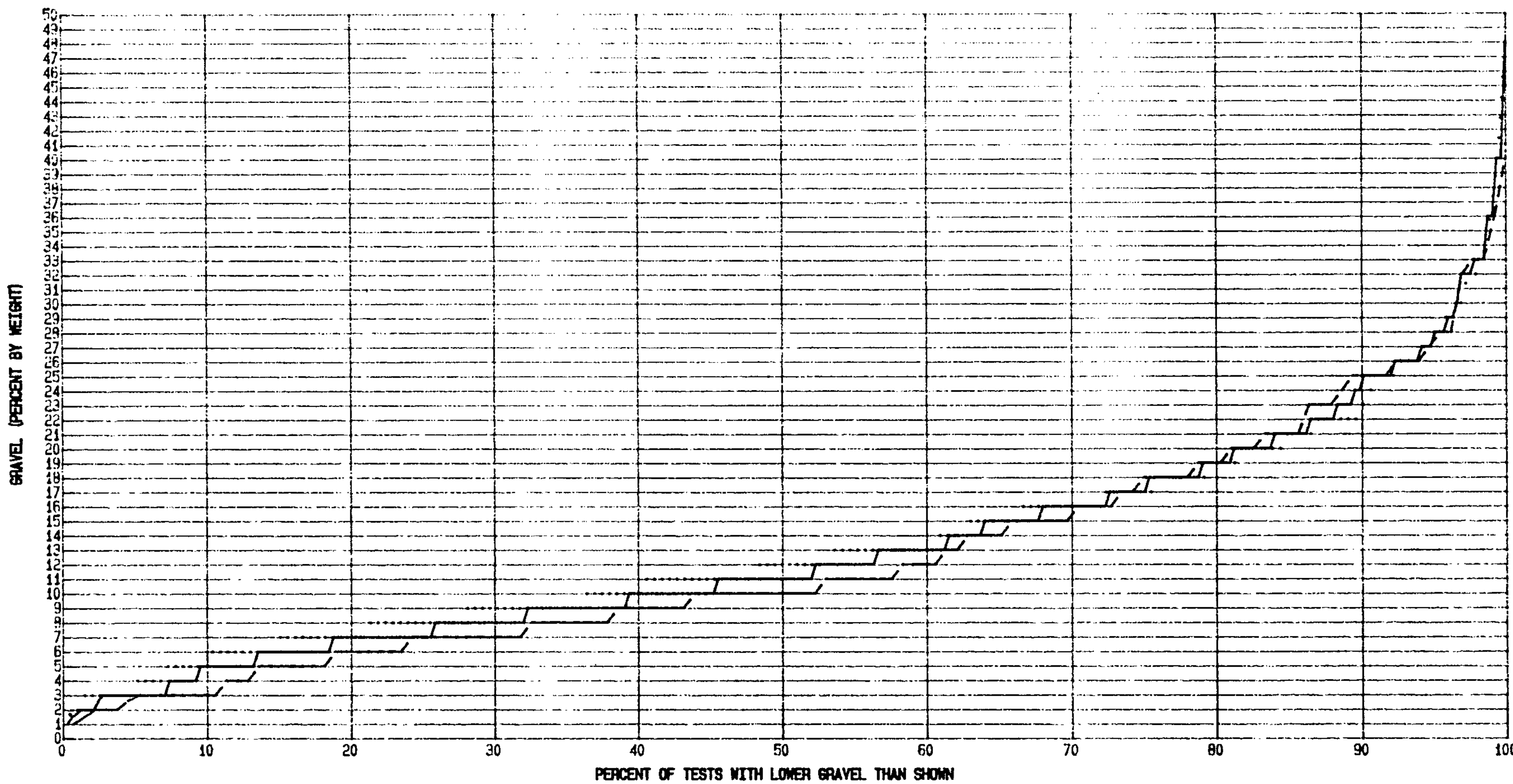
COBBLE - S-CURVE

Project LITTLE DELL DAM

Area RANDOM I

Boring No.

Date



Line Style	From Date	To Date	# Points	Mean	Std Dev	10 %	Median	90 %
. . . . .	01-01-92	12-31-92	192	13.48281	7.585097	5	12	22
- - - - -	01-01-91	12-31-91	132	12.59167	8.153303	3	10	25
———	01-01-90	12-31-92	325	13.09785	7.819332	5	11	24

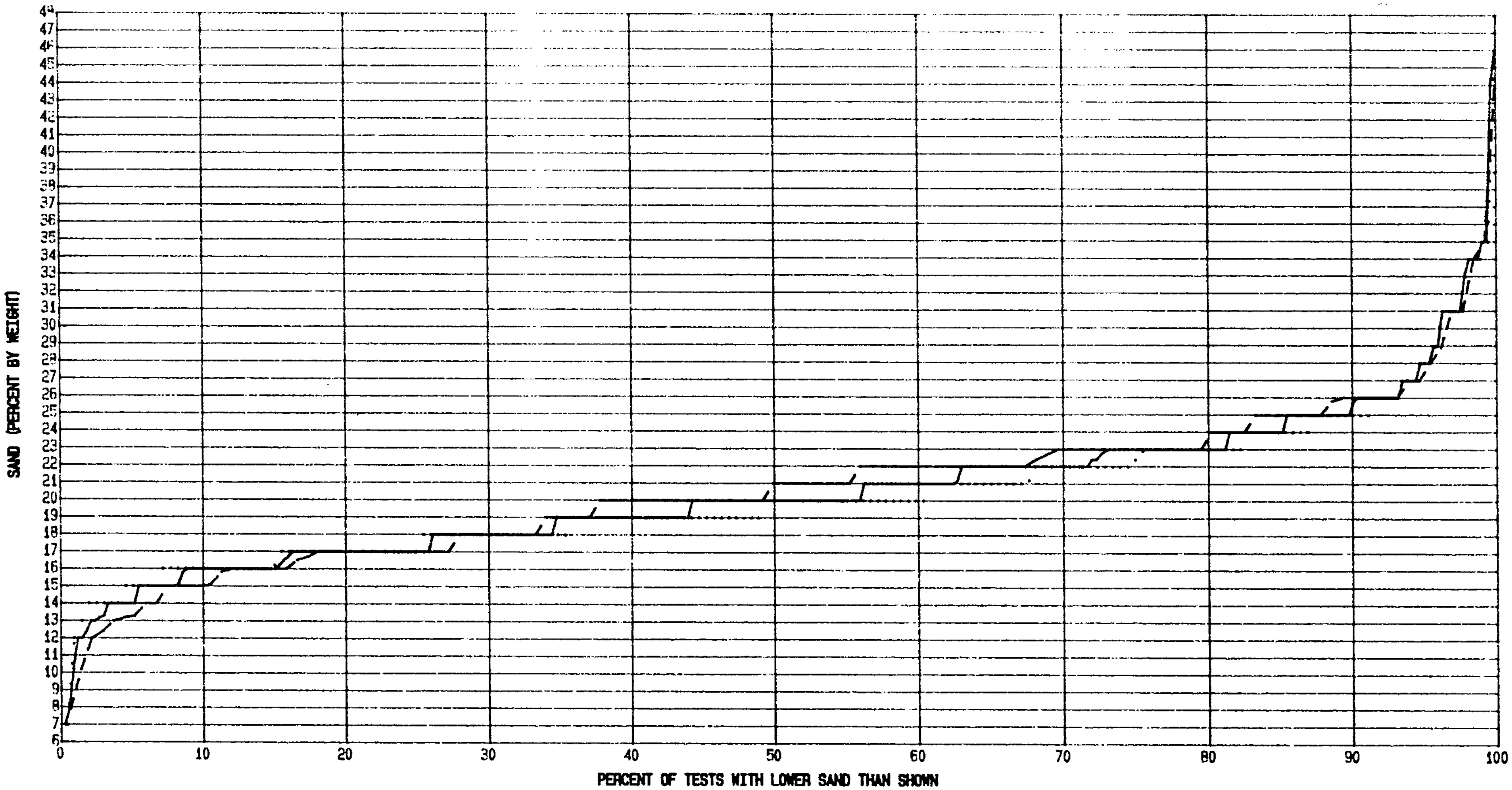
Project **LITTLE DELL DAM**

Area **RANDOM I**

Boring No.

Date

GRAVEL – S-CURVE



Line Style	From Date	To Date	# Points	Mean	Std Dev	10 %	Median	90 %
. . . . .	01-01-92	12-31-92	192	20.35781	4.525366	16	20	25
- - - - -	01-01-91	12-31-91	132	20.72652	4.865639	15	20	26
———	01-01-90	12-31-92	325	20.50646	4.655978	16	20	25

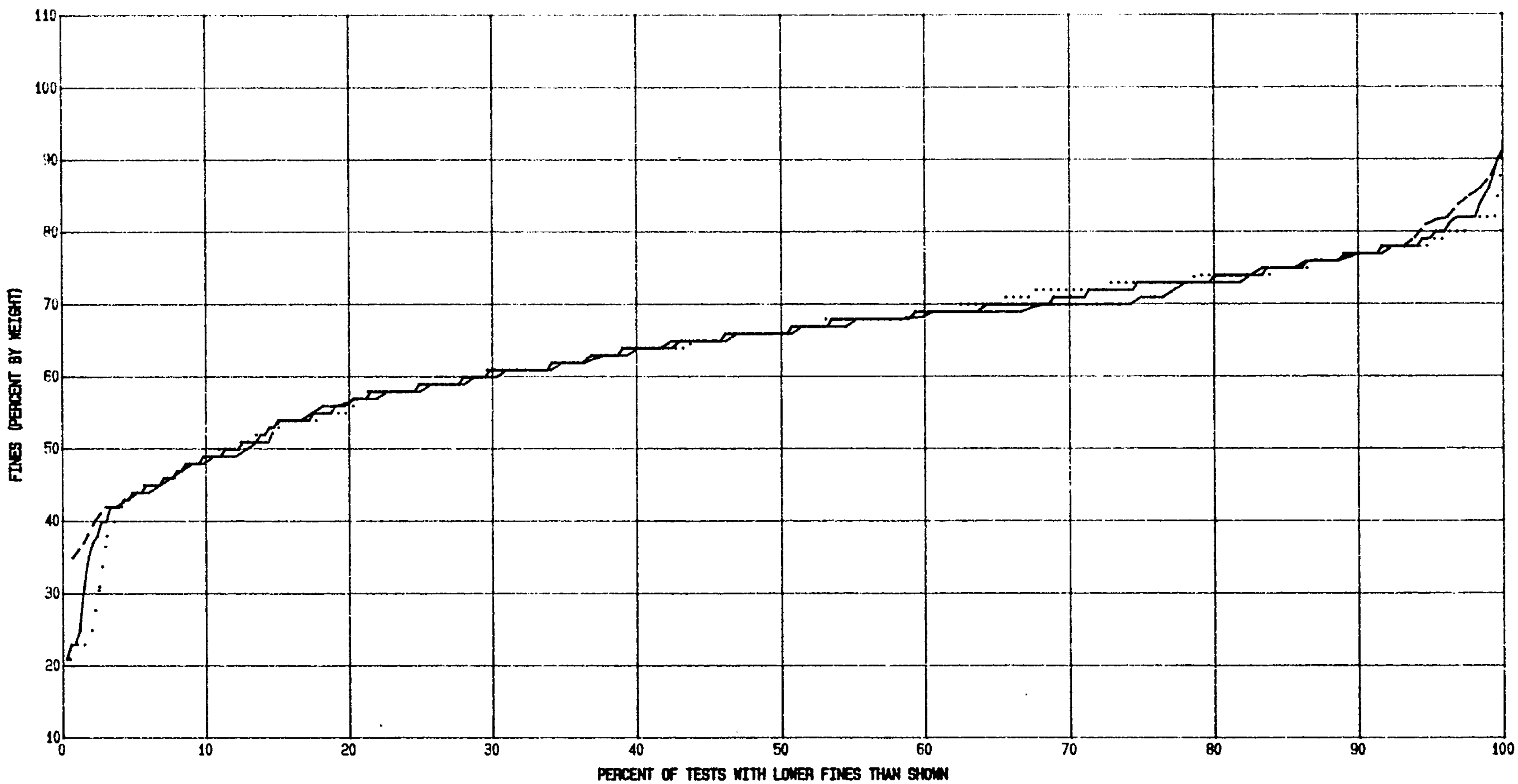
SAND - S-CURVE

Project **LITTLE DELL DAM**

Area **RANDOM I**

Boring No.

Date



Line Style	From Date	To Date	# Points	Mean	Std Dev	10 %	Median	90 %
. . . . . .	01-01-92	12-31-92	192	64.44582	11.74356	49	66	77
- - - - - -	01-01-91	12-31-91	132	64.68939	10.88207	48	66	76.5
———	01-01-90	12-31-92	325	64.56492	11.37199	49	66	77

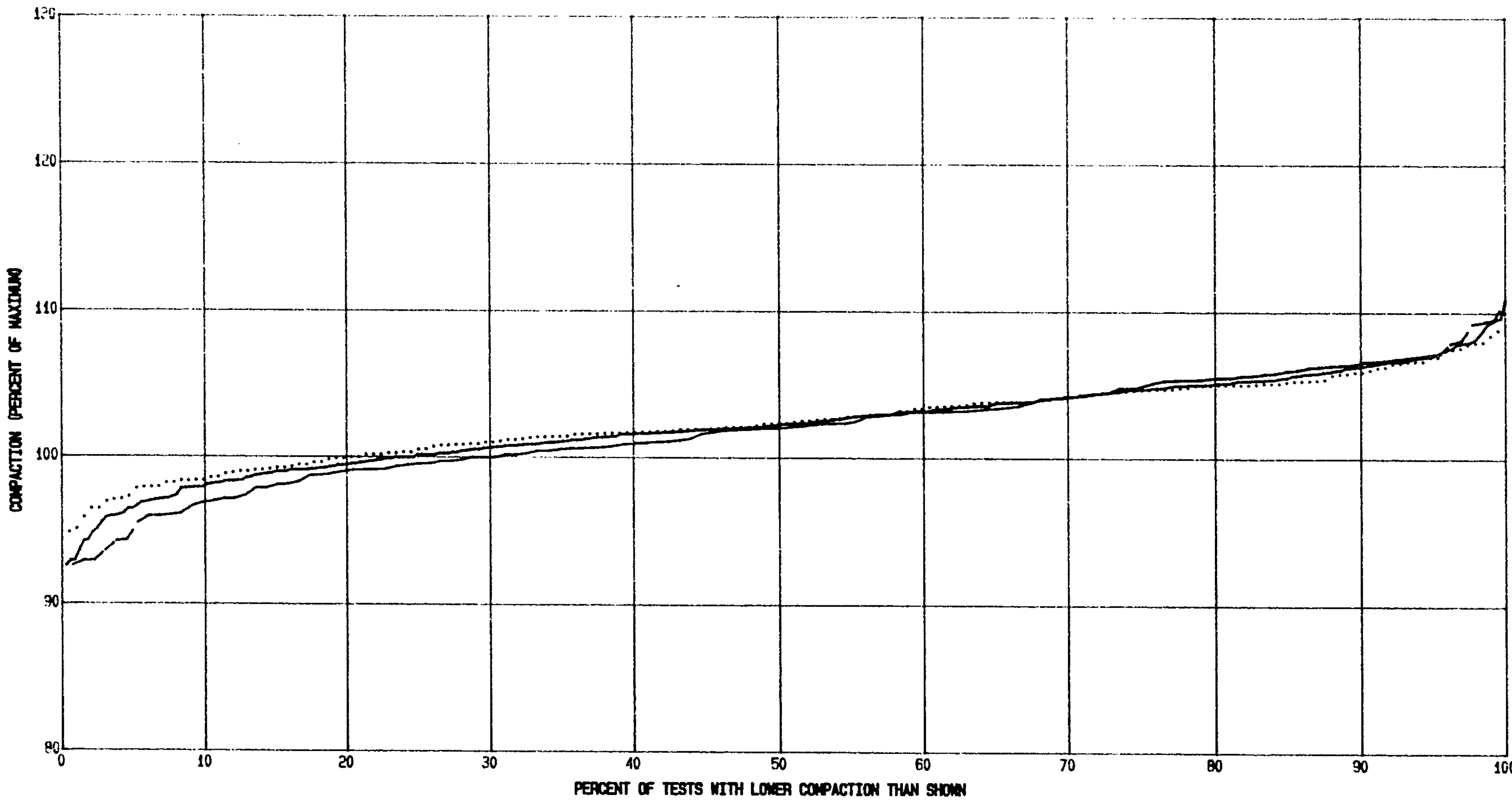
FINES - S-CURVE

Project **LITTLE DELL DAM**

Area **RANDOM I**

Boring No.

Date



Line Style	From Date	To Date	# Points	Mean	Std Dev	10 %	Median	90 %
. . . . . .	01-01-92	12-31-92	192	102.4696	2.88786	98.39715	102.3386	105.9423
– – – – –	01-01-91	12-31-91	132	101.9995	3.789518	96.89119	102.0333	106.4516
———	01-01-90	12-31-92	325	102.2822	3.283746	97.93814	102.2707	106.3063

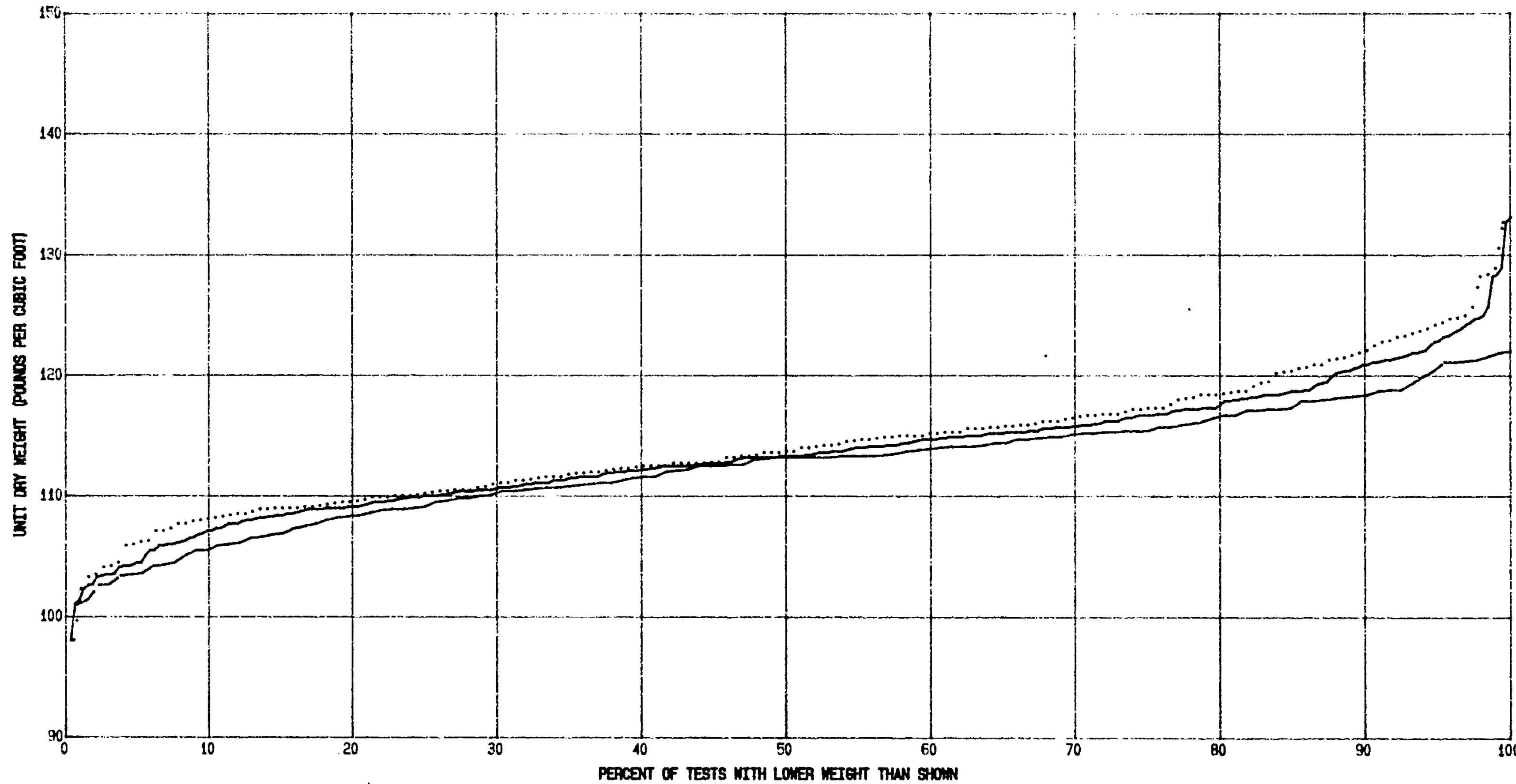
IN PLACE COMPACTION - S-CURVE

Project LITTLE DELL DAM

Area RANDOM I

Boring No.

Date



Line Style	From Date	To Date	# Points	Mean	Std Dev	10 %	Median	90 %
. . . . . .	01-01-92	12-31-92	192	114.3364	5.698671	108.1	113.6	121.9
- - - - - -	01-01-91	12-31-91	132	112.5258	4.802151	105.5	113.2	118.3
———	01-01-90	12-31-92	325	113.5941	5.411077	107.1	113.3	120.9

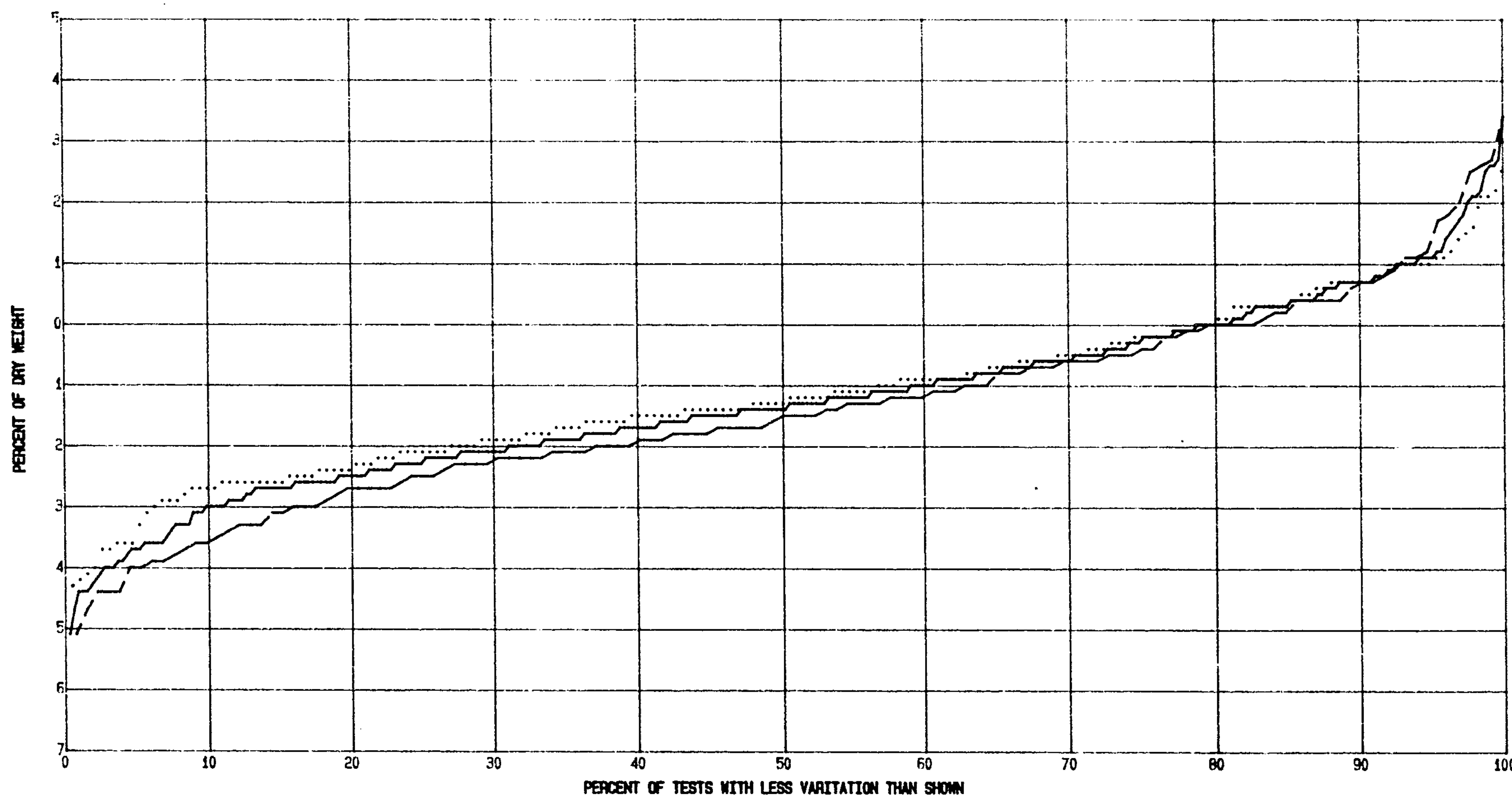
IN PLACE UNIT WEIGHT - S-CURVE

Project LITTLE DELL DAM

Area RANDOM I

Boring No.

Date



Line Style	From Date	To Date	# Points	Mean	Std Dev	10 %	Median	90 %
. . . . .	01-01-92	12-31-92	192	-1.132291	1.359666	-2.7	-1.3	.7
— — — —	01-01-91	12-31-91	132	-1.404546	1.649235	-3.6	-1.6	.6
———	01-01-90	12-31-92	325	-1.248616	1.488941	-3	-1.4	.7

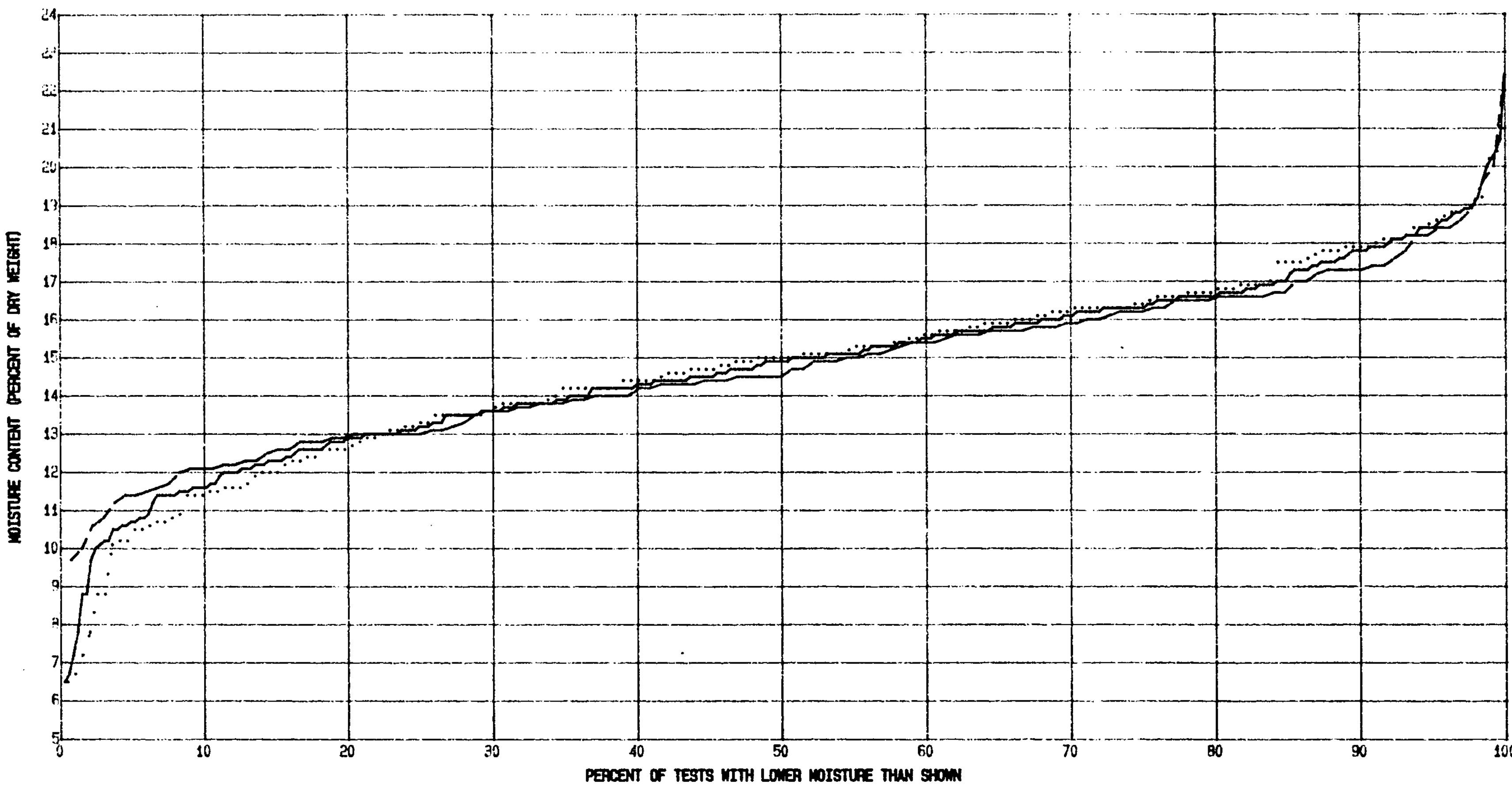
OMC COMPARISON - S-CURVE

Project **LITTLE DELL DAM**

Area **RANDOM I**

Boring No.

Date



Line Style	From Date	To Date	# Points	Mean	Std Dev	10 %	Median	90 %
. . . . . .	01-01-92	12-31-92	192	14.77604	2.577062	11.4	15	17.9
- - - - - -	01-01-91	12-31-91	132	14.78258	2.162577	12.1	14.5	17.3
———	01-01-90	12-31-92	325	14.77508	2.410427	11.6	14.9	17.8

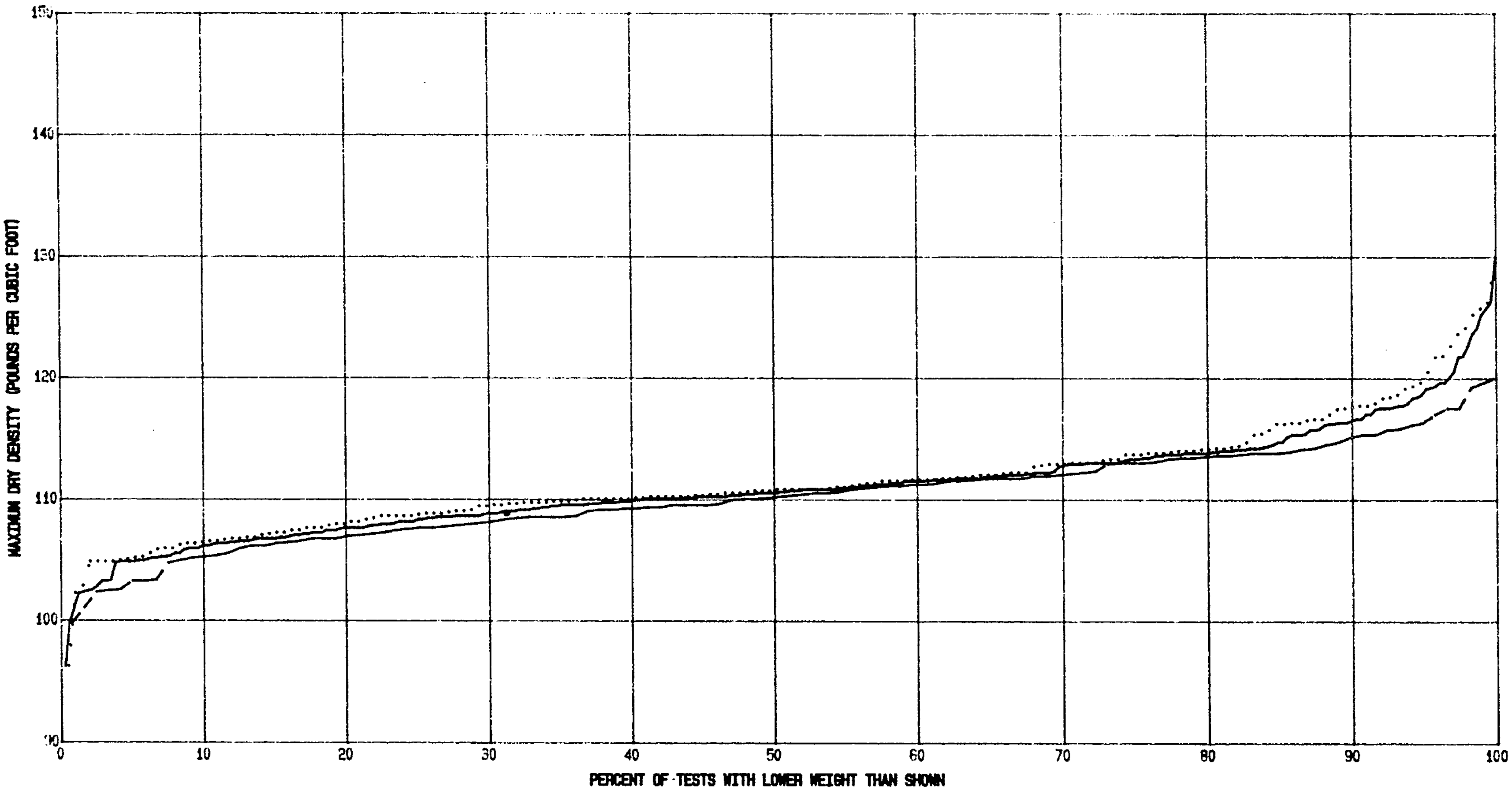
MOISTURE CONTENT — S-CURVE

Project **LITTLE DELL DAM**

Area **RANDOM I**

Boring No.

Date



Line Style	From Date	To Date	# Points	Mean	Std Dev	10 %	Median	90 %
. . . . . .	01-01-92	12-31-92	191	111.599	4.682185	106.5	110.8	117.6
– – – – –	01-01-91	12-31-91	119	110.2874	3.951547	105.2	110.2	115.2
———	01-01-90	12-31-92	311	111.0862	4.451773	106.2	110.6	116.4

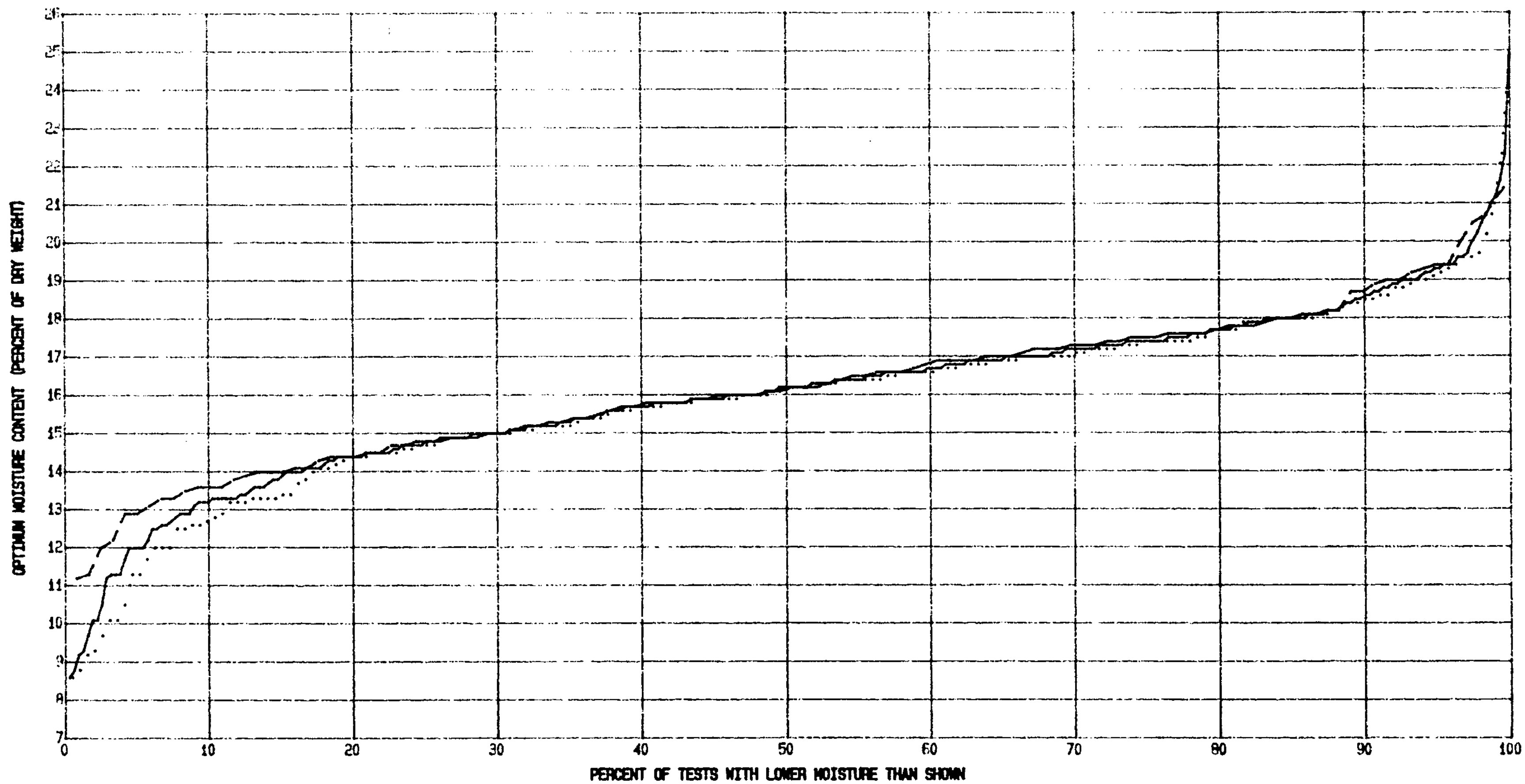
Project LITTLE DELL DAM

Area RANDOM I

Boring No.

Date

LABORATORY MAX. DRY DENSITY - S-CURVE



Line Style	From Date	To Date	# Points	Mean	Std Dev	10 %	Median	90 %
. . . . . .	01-01-92	12-31-92	191	15.89895	2.411645	12.7	16.2	18.4
– – – – – –	01-01-91	12-31-91	119	16.19916	2.024354	13.6	16.1	18.7
————	01-01-90	12-31-92	311	16.01608	2.268677	13.2	16.2	18.5

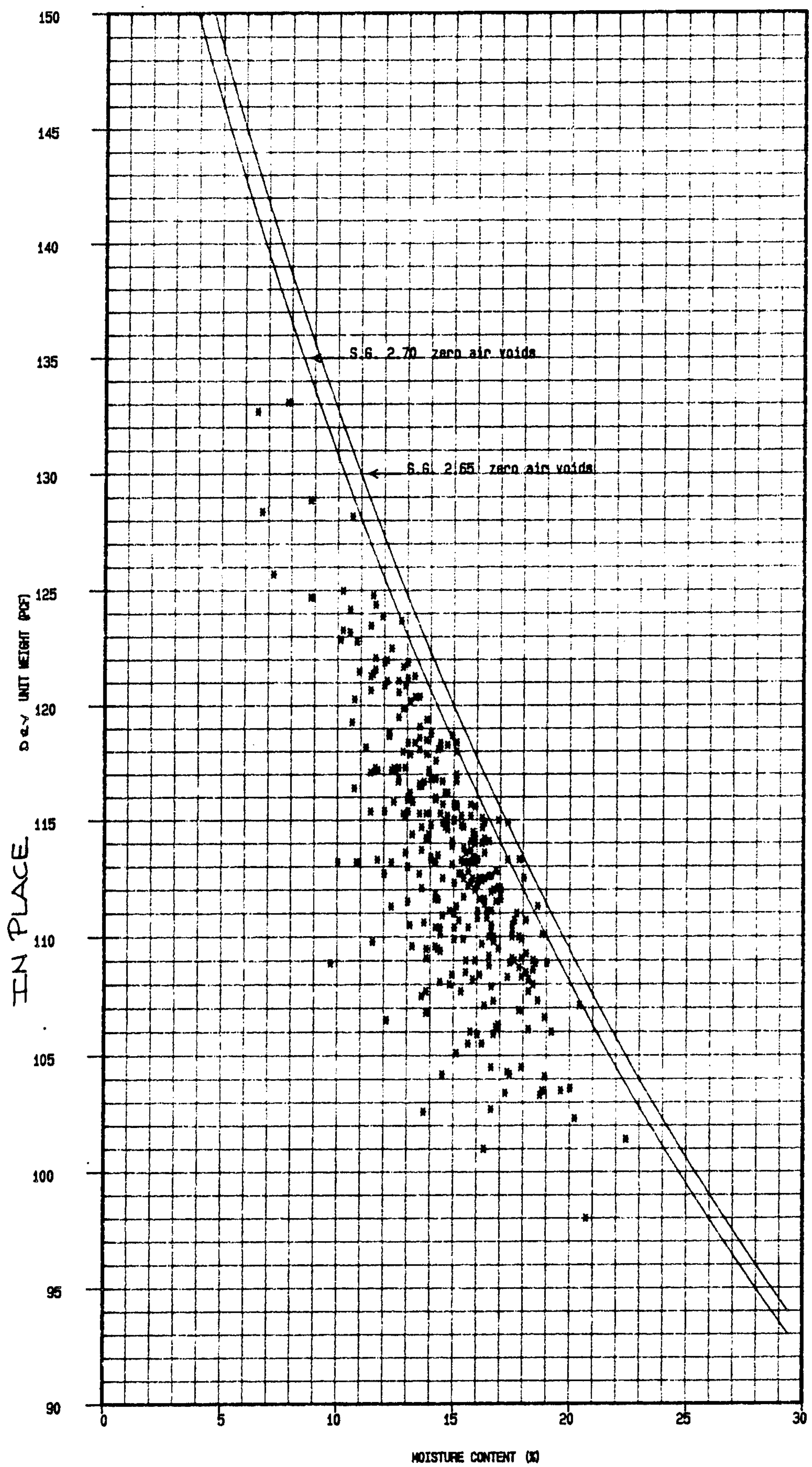
Project LITTLE DELL DAM

Area RANDOM I

Boring No.

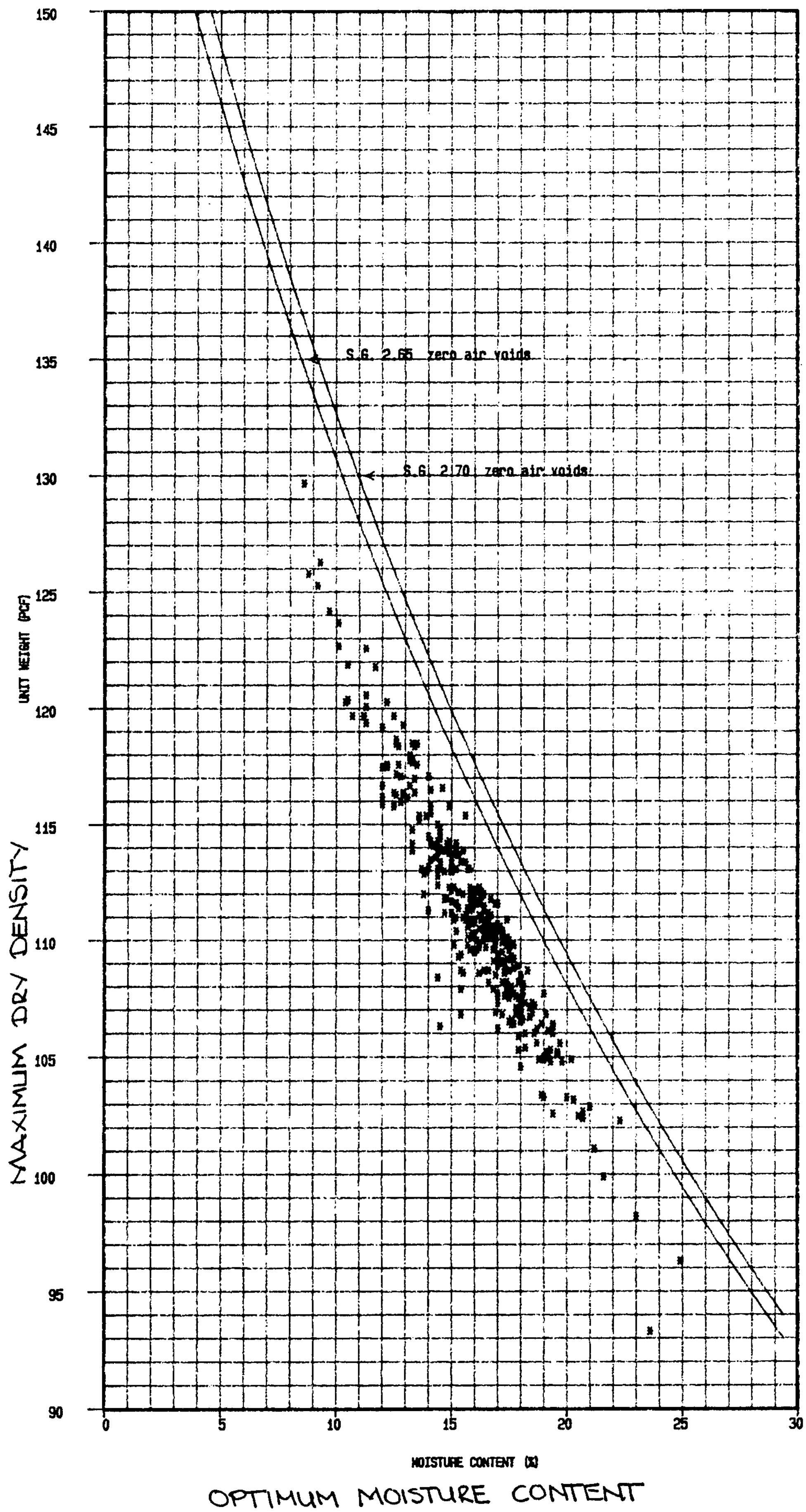
Date

LABORATORY OPTIMUM MOISTURE CONTENT - S-CURVE

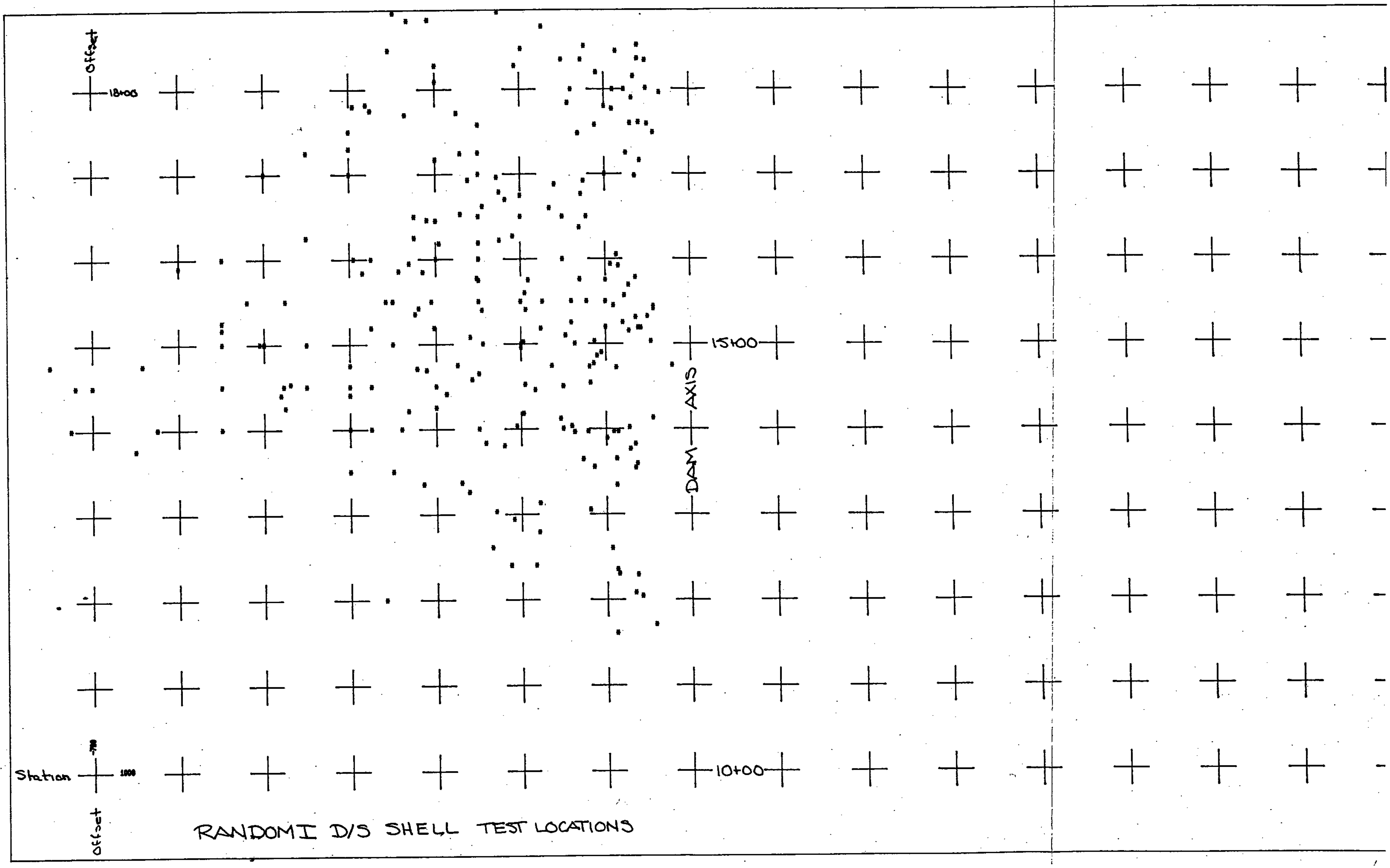


IN PLACE

RANDOM I

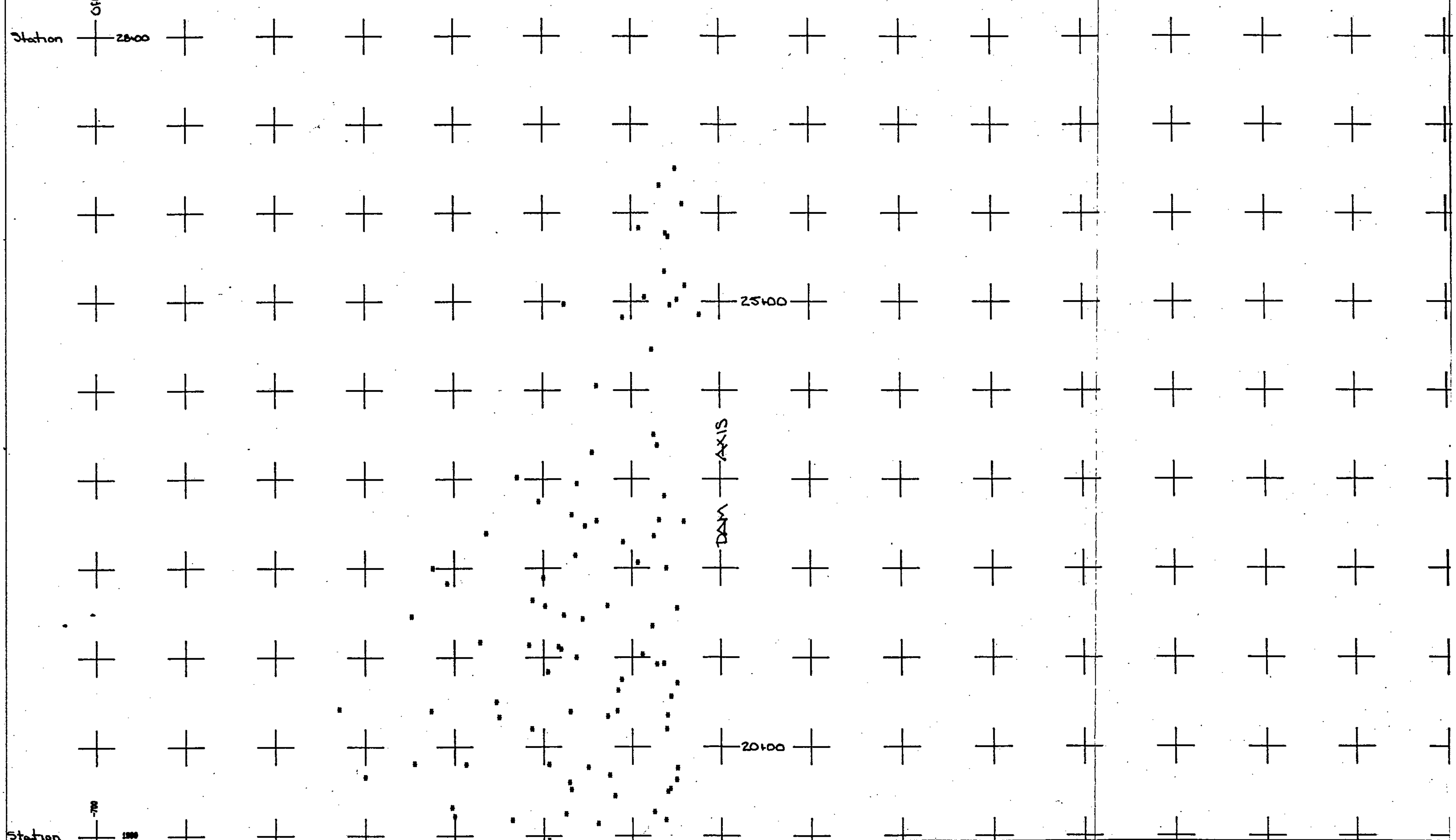

150
145
140
135
130
125
120
115
110
105
100
95
90
UNIT WEIGHT (PCF)
MAXIMUM DRY DENSITY
S.G. 2.65 zero air voids
S.G. 2.70 zero air voids
0
5
10
15
20
25
30
MOISTURE CONTENT (%)
OPTIMUM MOISTURE CONTENT

RANDOM I



RANDOM I D/S SHELL TEST LOCATIONS

RANDOM I D/S SHELL TEST LOCATIONS



APPENDIX II

FIELD CONTROL DATA, LITTLE DELL DAM

RANDOM II
UPSTREAM SHELL

Specifications Comparison Report

Gradations Report

Compaction Report

Comments Report

Percent Compaction vs Moisture Content with respect to the Optimum Moisture Content

Field Dry Density vs Percent Compaction

and

Percent Compaction vs Elevation

Percent Moisture Content with respect to the Optimum Moisture Content vs Elevation

Gradation Curves

Plasticity Charts

S Curves

- % Cobbles
- % Gravel
- % Sand
- % Fines
- % Compaction
- Unit Weight
- Moisture Content vs Optimum Moisture Content
- Moisture Content
- Maximum Dry Density (Laboratory)
- Optimum Moisture Content (Laboratory)

Sand Cone/In Place Dry Unit Weight vs Moisture Content

Laboratory Maximum Dry Unit Weight vs Optimum Moisture Content

Test Locals

QUALITY ACCEPTANCE TESTING - SPECIFICATIONS COMPARISON REPORT REPORT NUMBER: RII.0

PROJECT: LITTLE DELL LAKE, DAM AND APPURTENANCES RIVER: SALT LAKE CITY STREAMS STATE: UTAH TOWN: SALT LAKE CITY	CONTRACT NO. DACW05-89-C-0045 CONTRACTOR: CLEMENT BROTHERS AND J.E. STARNES CO.	DATE OF REPORT: 12-07-92 01-01-90 THRU 12-31-92

EMBANKMENT ZONE	MIN. DESIGNED % COMP	SPEC. W.C. % RANGE	LOOSE LIFT THICK. (IN)	NUMBER OF PASSES	COMPACTION EQUIPMENT
RANDOM II	95	-3 TO 1	12	5	SD150D, SD150F, SP60

TEST NUMBER	DATE	ELEV	LOCATION		% COBBL	% GRAV	% SAND	% FINES	% COMPACTION DESIGN >= 95%	MOISTURE IN SPEC -3 %- 1 %	GRADATION IN SPEC	GRAVELS IN SPEC > %	FINES IN SPEC < 45 %	TEST IN SPEC	STATUS FAILED TESTS
			STATION	OFFSET											
103	04-20-90	5644.0	2175	207	0.0	37.0	28.1	34.9	Y	Y	Y	Y	Y	Y	
110	05-02-90	5645.0	2150	218	9.3	**29.7**	29.5	31.5	Y	Y	Y	N	Y	N	
112	05-03-90	5654.0	2260	320	9.6	**26.7**	33.7	30.0	Y	N	Y	N	Y	N	OLM
113	05-05-90	5657.0	2256	352	0.0	**16.7**	40.7	42.6	N	N	N	N	Y	N	OLD,M
115	05-07-90	5658.0	2258	360	14.9	**22.9**	23.7	38.5	Y	Y	N	N	Y	N	
119	05-09-90	5661.0	2250	284	6.5	42.1	43.0	8.4	Y	Y	Y	Y	Y	Y	
120	05-09-90	5663.0	2304	419	8.1	40.9	21.3	29.7	N	N	Y	Y	Y	N	RW
127	05-11-90	5666.0	2255	345	4.1	**25.1**	32.0	38.8	Y	Y	N	N	Y	N	RW,RT
129	05-16-90	5665.1	2250	290	6.3	**23.0**	26.3	44.4	Y	Y	N	N	Y	N	
131	05-17-90	5666.5	2235	330	14.0	41.2	28.1	16.7	N	Y	Y	Y	Y	N	OLD
132	05-17-90	5668.5	2400	498	21.2	38.9	22.2	17.7	N	N	N	Y	Y	N	RW,RT
133	05-18-90	5668.5	2247	355	15.2	35.4	25.4	24.0	Y	Y	Y	Y	Y	Y	RM
134	05-19-90	5669.0	2350	386	4.4	47.5	31.0	17.1	Y	N	Y	Y	Y	N	RM
135	05-22-90	5596.5	1351	578	3.8	43.9	31.2	21.1	Y	Y	Y	Y	Y	Y	
138	05-24-90	5601.0	1331	630	11.1	38.9	25.5	24.5	Y	N	Y	Y	Y	N	OLM
142	05-25-90	5597.4	1331	475	11.4	**28.6**	28.6	31.4	Y	N	Y	N	Y	N	RW,RT
146	05-28-90	5602.6	1332	711	5.4	30.6	28.5	35.5	Y	Y	Y	Y	Y	Y	
142A	05-26-90	5597.4	1331	475	3.3	37.5	29.3	29.9	N	Y	Y	Y	Y	N	OLD
150	05-29-90	5602.5	1389	668	13.2	41.8	26.7	18.3	Y	Y	Y	Y	Y	Y	
151	05-29-90	5602.5	1375	679	11.2	32.9	27.2	28.7	Y	Y	Y	Y	Y	Y	
153	06-04-90	5598.0	1350	476	12.6	33.8	35.4	18.2	Y	Y	Y	Y	Y	Y	
154	06-04-90	5600.5	1240	500	17.3	**29.6**	26.3	26.8	Y	Y	Y	N	Y	N	
159	06-06-90	5604.0	1353	585	4.4	38.6	28.4	28.6	Y	N	Y	Y	Y	N	RW,RT
160	06-06-90	5605.2	1207	586	7.6	30.0	25.1	37.3	N	N	Y	Y	Y	N	OLD,M
161	06-07-90	5603.5	1309	602	19.5	34.8	27.4	18.3	Y	Y	N	Y	Y	N	
162	06-07-90	5603.7	1351	641	18.7	36.1	23.6	21.6	Y	Y	Y	Y	Y	Y	
163	06-08-90	5598.3	1937	583	20.9	36.0	26.4	16.7	Y	Y	N	Y	Y	N	
164	06-08-90	5605.0	1264	506	15.6	34.4	27.6	22.4	Y	Y	Y	Y	Y	Y	
170	06-12-90	5597.1	1418	364	8.5	32.9	31.0	27.6	Y	Y	Y	Y	Y	Y	
174	06-12-90	5595.5	1373	390	6.5	43.5	28.5	21.5	Y	Y	Y	Y	Y	Y	
177	06-13-90	5597.0	1339	292	26.7	33.2	25.4	14.7	Y	Y	N	Y	Y	N	
178	06-13-90	5597.7	1417	381	19.0	44.3	25.0	11.7	N	Y	Y	Y	Y	N	OLD
180	06-14-90	5610.0	1257	663	21.6	44.6	23.2	10.6	Y	N	N	Y	Y	N	OLM
181	06-14-90	5605.4	1271	437	33.9	**26.3**	28.0	11.8	Y	Y	N	N	Y	N	
188	06-18-90	5599.3	1324	398	15.1	35.1	25.4	24.4	N	Y	Y	Y	Y	N	OLD
196	06-20-90	5608.2	1355	605	12.5	32.4	34.1	21.0	Y	Y	Y	Y	Y	Y	
197	06-20-90	5608.4	1248	534	7.4	38.4	33.2	21.0	Y	Y	Y	Y	Y	Y	
198	06-20-90	5603.1	1302	400	12.8	38.4	29.8	19.0	Y	Y	Y	Y	Y	Y	
199	06-21-90	5614.4	1223	650	15.8	35.9	24.5	23.8	N	Y	Y	Y	Y	N	RW;RT
200	06-21-90	5612.3	1188	462	4.9	36.0	34.2	24.9	Y	N	Y	Y	Y	N	RW,RT
201	06-21-90	5608.0	1310	528	9.1	40.9	32.2	17.8	Y	N	Y	Y	Y	N	RW,RT
206	06-22-90	5613.0	1278	678	6.4	34.1	28.8	30.7	Y	Y	Y	Y	Y	Y	
212	06-25-90	5607.0	1305	417	17.8	36.8	26.4	19.0	Y	Y	Y	Y	Y	Y	

TEST NUMBER	DATE	ELEV	LOCATION STATION	LOCATION OFFSET	% COBBL	% GRAV	% SAND	% FINES	% COMPACTION DESIGN >= 95%	MOISTURE IN SPEC -3 %- 1 %	GRADATION IN SPEC	GRAVELS IN SPEC > %	FINES IN SPEC < 45 %	TEST IN SPEC	STATUS FAILED TESTS
214	06-25-90	5608.0	1370	574	11.3	34.8	31.6	22.3	Y	Y	Y	Y	Y	Y	
215	06-25-90	5610.0	1279	652	23.8	32.2	26.8	17.2	Y	Y	N	Y	Y	N	
218	06-26-90	5604.0	1414	307	16.3	37.8	26.7	19.2	Y	Y	Y	Y	Y	Y	
219	06-26-90	5610.0	1250	636	16.4	33.8	30.0	19.8	Y	Y	N	Y	Y	N	
220	06-26-90	5609.5	1375	655	29.8	32.1	25.9	12.2	Y	Y	N	Y	Y	N	
221	06-27-90	5603.3	1375	300	7.3	33.5	32.2	27.0	Y	N	Y	Y	Y	N	OLM
222	06-27-90	5608.2	1362	450	19.1	32.4	28.2	20.3	Y	Y	N	Y	Y	N	
223	06-27-90	5603.5	1425	270	9.2	41.7	28.4	20.7	Y	Y	Y	Y	Y	Y	
224	06-27-90	5607.2	1360	364	17.8	32.6	27.3	22.3	Y	Y	Y	Y	Y	Y	
225	06-28-90	5609.2	1310	522	10.9	30.8	30.0	28.3	Y	Y	Y	Y	Y	Y	
226	06-28-90	5608.6	1389	465	10.4	49.3	25.5	14.8	Y	Y	Y	Y	Y	Y	
228	06-28-90	5609.0	1290	415	20.7	34.2	28.2	16.9	N	N	N	Y	Y	N	OLD,M
229	06-28-90	5615.5	1268	643	7.8	39.7	27.3	25.2	Y	Y	Y	Y	Y	Y	
230	06-29-90	5612.8	1325	550	20.2	**28.8**	28.5	22.5	Y	Y	N	N	Y	N	
231	06-29-90	5611.2	1270	470	17.3	31.0	28.6	23.1	N	Y	Y	Y	Y	N	OLD
159A	06-07-90	5601.0	1360	590	4.4	38.6	28.4	28.6	Y	Y	Y	Y	Y	Y	
232	07-04-90	5615.5	1300	586	8.1	39.5	28.4	24.0	Y	Y	Y	Y	Y	Y	
235	07-05-90	5611.3	1302	432	15.9	31.6	25.8	26.7	Y	Y	Y	Y	Y	Y	
237	07-06-90	5615.5	1325	550	20.9	32.8	21.9	24.4	Y	N	N	Y	Y	N	OLM
238	07-06-90	5619.5	1343	635	24.6	**27.4**	21.3	26.7	Y	Y	N	N	Y	N	
239	07-07-90	5619.5	1260	629	11.6	**26.4**	37.5	24.5	Y	N	Y	N	Y	N	OLM
240	07-07-90	5611.4	1375	329	8.7	36.5	32.7	22.1	Y	Y	Y	Y	Y	Y	
244	07-07-90	5619.8	1312	545	15.5	40.3	28.0	16.2	Y	Y	Y	Y	Y	Y	
255	07-11-90	5618.0	1295	360	1.7	**19.4**	39.3	39.6	Y	Y	N	N	Y	N	
261	07-12-90	5626.0	1250	620	3.6	**27.5**	32.8	36.1	Y	Y	N	N	Y	N	
277	07-18-90	5601.4	1460	575	19.0	45.0	20.0	16.0	Y	Y	Y	Y	Y	Y	
278	07-18-90	5604.5	1470	680	8.0	44.0	26.0	22.0	Y	Y	Y	Y	Y	Y	
279	07-18-90	5601.0	1460	500	11.0	50.0	23.0	16.0	Y	Y	Y	Y	Y	Y	
280	07-19-90	5600.0	1463	475	19.0	45.0	21.0	15.0	Y	Y	Y	Y	Y	Y	
281	07-19-90	5593.3	1488	245	10.0	43.0	26.0	21.0	Y	Y	Y	Y	Y	Y	
282	07-19-90	5598.0	1481	318	6.0	**27.0**	29.0	38.0	Y	Y	Y	N	Y	N	
283	07-19-90	5611.0	1445	700	7.0	31.0	27.0	35.0	Y	Y	Y	Y	Y	Y	
284	07-20-90	5601.0	1486	363	7.0	42.0	23.0	28.0	Y	Y	Y	Y	Y	Y	
286	07-21-90	5601.0	1480	270	13.0	32.0	25.0	30.0	Y	Y	Y	Y	Y	Y	
287	07-21-90	5608.0	1459	510	10.0	34.0	25.0	31.0	Y	Y	Y	Y	Y	Y	
288	07-21-90	5603.7	1480	329	7.0	31.0	29.0	33.0	Y	Y	Y	Y	Y	Y	
290	07-21-90	5616.7	1478	677	11.0	31.0	24.0	34.0	Y	Y	Y	Y	Y	Y	
294	07-22-90	5620.5	1430	721	5.0	31.0	38.0	26.0	Y	Y	Y	Y	Y	Y	
296	07-22-90	5618.1	1328	588	21.0	33.0	26.0	20.0	Y	Y	N	Y	Y	N	
297	07-23-90	5613.5	1560	415	15.0	35.0	31.0	19.0	Y	Y	Y	Y	Y	Y	
299	07-24-90	5609.3	1483	290	17.8	38.1	28.4	15.7	Y	Y	Y	Y	Y	Y	
301	07-24-90	5621.8	1363	654	22.0	31.0	27.0	20.0	Y	Y	N	Y	Y	N	
305	07-24-90	5614.5	1415	290	15.0	38.0	35.0	12.0	Y	Y	Y	Y	Y	Y	
306	07-25-90	5619.0	1350	500	13.0	41.0	27.0	19.0	Y	Y	Y	Y	Y	Y	
307	07-25-90	5617.0	1250	400	10.0	35.0	34.0	21.0	N	Y	Y	Y	Y	N	RW,RT
310	07-26-90	5618.5	1420	357	23.0	37.0	23.0	17.0	Y	Y	N	Y	Y	N	
311	07-26-90	5615.0	1500	320	13.0	40.0	29.0	18.0	Y	Y	Y	Y	Y	Y	
312	07-26-90	5617.0	1440	485	15.0	31.0	32.0	22.0	Y	N	Y	Y	Y	N	OLM
313	07-26-90	5623.7	1455	655	20.0	38.0	24.0	18.0	Y	Y	Y	Y	Y	Y	
322	07-28-90	5626.0	1500	310	8.0	34.0	33.0	25.0	Y	Y	Y	Y	Y	Y	
314	07-26-90	5624.7	1300	555	15.0	**29.0**	32.0	24.0	Y	Y	N	N	Y	N	
315	07-26-90	5620.8	1310	310	6.0	**20.0**	31.0	43.0	Y	Y	N	N	Y	N	

TEST NUMBER	DATE	ELEV	LOCATION STATION	LOCATION OFFSET	% COBBL	% GRAV	% SAND	% FINES	% COMPACTION DESIGN >= 95%	MOISTURE IN SPEC -3 %- 1 %	GRADATION IN SPEC	GRAVELS IN SPEC > %	FINES IN SPEC < 45 %	TEST IN SPEC	STATUS FAILED TESTS
316	07-27-90	5620.8	1590	390	7.0	35.0	29.0	29.0	Y	Y	Y	Y	Y	Y	
317	07-27-90	5620.7	1500	477	12.0	47.0	26.0	15.0	Y	Y	Y	Y	Y	Y	
319	07-27-90	5626.0	1368	603	21.0	35.0	25.0	19.0	Y	N	N	Y	Y	N	OLM
320	07-28-90	5628.0	1415	500	14.0	38.0	29.0	19.0	Y	Y	Y	Y	Y	Y	
321	07-28-90	5629.0	1215	539	8.0	39.0	27.0	26.0	Y	Y	Y	Y	Y	Y	
323	07-28-90	5622.8	1443	360	16.0	46.0	22.0	16.0	N	Y	Y	Y	Y	N	OLD
326	07-29-90	5624.8	1510	600	19.0	37.0	26.0	18.0	Y	Y	Y	Y	Y	Y	
324A	07-30-90	5626.2	1354	410	16.0	41.0	27.0	16.0	Y	Y	Y	Y	Y	Y	
329	07-30-90	5631.5	1304	570	12.0	41.0	26.0	21.0	Y	Y	Y	Y	Y	Y	
330	07-30-90	5628.3	1600	385	6.0	32.0	34.0	28.0	Y	Y	Y	Y	Y	Y	
331	07-31-90	5631.7	1450	600	21.0	36.0	25.0	18.0	Y	Y	N	Y	Y	N	
334	07-31-90	5632.6	1350	500	14.0	49.0	22.0	15.0	Y	Y	Y	Y	Y	Y	
335	07-31-90	5629.0	1539	328	10.0	36.0	30.0	24.0	Y	Y	Y	Y	Y	Y	
336	08-01-90	5633.0	1384	455	12.0	47.0	25.0	16.0	Y	Y	Y	Y	Y	Y	
337	08-01-90	5629.5	1325	300	21.0	40.0	23.0	16.0	Y	Y	N	Y	Y	N	
339	08-01-90	5634.1	1455	450	12.0	35.0	29.0	24.0	Y	Y	Y	Y	Y	Y	
340	08-01-90	5636.3	1223	400	11.0	42.0	29.0	18.0	Y	Y	Y	Y	Y	Y	
341	08-02-90	5636.5	1285	450	18.0	48.0	21.0	13.0	Y	Y	N	Y	Y	N	
342	08-02-90	5638.0	1210	400	16.0	**24.0**	26.0	34.0	Y	Y	Y	N	Y	N	
343	08-02-90	5638.5	1500	550	22.0	41.0	22.0	15.0	Y	Y	N	Y	Y	N	
344	08-03-90	5639.0	1450	425	16.0	40.0	25.0	19.0	Y	Y	Y	Y	Y	Y	
345	08-03-90	5638.4	1400	548	11.0	49.0	24.0	16.0	Y	Y	Y	Y	Y	Y	
346	08-03-90	5639.7	1550	550	13.0	**26.0**	30.0	31.0	Y	Y	Y	N	Y	N	
347	08-04-90	5639.0	1350	375	17.0	**28.0**	30.0	25.0	Y	N	Y	N	Y	N	RW,RT
347A	08-04-90	5641.1	1413	532	8.0	51.0	26.0	15.0	Y	Y	Y	Y	Y	Y	
348	08-06-90	5639.9	1435	484	13.0	33.0	35.0	19.0	Y	N	Y	Y	Y	N	OLM
349	08-06-90	5639.0	1346	400	14.0	42.0	25.0	19.0	Y	Y	Y	Y	Y	Y	
350	08-07-90	5639.5	1550	350	14.0	32.0	29.0	25.0	Y	N	Y	Y	Y	N	RW,RT
350A	08-07-90	5640.8	1573	400	10.5	41.1	26.4	22.0	N	Y	Y	Y	Y	N	RW,RT
351	08-07-90	5642.5	1650	410	13.0	**25.0**	36.0	26.0	Y	Y	Y	N	Y	N	RW,RT
352	08-08-90	5644.4	1600	550	11.0	38.0	28.0	23.0	Y	Y	Y	Y	Y	Y	RM
350B	08-08-90	5641.7	1573	376	9.0	37.0	29.0	25.0	Y	Y	Y	Y	Y	Y	
351A	08-08-90	5643.7	1560	515	11.0	50.0	24.0	15.0	Y	Y	Y	Y	Y	Y	
353	08-09-90	5640.4	1508	377	12.0	50.0	23.0	15.0	Y	Y	Y	Y	Y	Y	
354	08-09-90	5645.1	1437	498	11.0	40.0	29.0	20.0	Y	Y	N	Y	Y	N	
355	08-09-90	5646.8	1420	460	12.0	44.0	27.0	17.0	Y	Y	Y	Y	Y	Y	
356	08-10-90	5647.7	1575	470	15.0	38.0	27.0	20.0	Y	Y	Y	Y	Y	Y	
357	08-10-90	5649.3	1705	450	0.0	41.0	33.0	26.0	Y	Y	Y	Y	Y	Y	
358	08-10-90	5648.1	1642	510	12.0	46.0	26.0	16.0	Y	Y	Y	Y	Y	Y	
359	08-10-90	5645.6	1287	398	15.0	40.0	28.0	17.0	Y	Y	Y	Y	Y	Y	
361	08-10-90	5648.2	1500	470	12.0	37.0	29.0	22.0	Y	Y	Y	Y	Y	Y	
362	08-11-90	5650.0	1329	500	16.0	37.0	26.0	21.0	N	Y	Y	Y	Y	N	OLD
363	08-11-90	5645.0	1680	429	12.0	40.0	29.0	19.0	Y	Y	Y	Y	Y	Y	
364	08-12-90	5650.0	1350	470	17.0	43.0	24.0	16.0	Y	Y	Y	Y	Y	Y	
365	08-12-90	5649.0	1560	450	20.0	47.0	20.0	13.0	Y	Y	N	Y	Y	N	
366	08-12-90	5648.5	1330	385	19.0	48.0	20.0	13.0	Y	Y	Y	Y	Y	Y	
367	08-13-90	5649.3	1426	435	10.0	41.0	30.0	19.0	Y	Y	Y	Y	Y	Y	
369	08-14-90	5653.0	1575	450	10.0	38.0	31.0	21.0	Y	Y	Y	Y	Y	Y	
374	08-15-90	5668.4	2313	400	18.0	32.0	27.0	23.0	N	Y	Y	Y	Y	N	OLD
375	08-15-90	5667.9	2225	297	1.0	**26.0**	35.0	38.0	Y	Y	N	N	Y	N	
376	08-15-90	5653.6	1625	460	21.0	36.0	25.0	18.0	Y	Y	N	Y	Y	N	
378	08-15-90	5656.0	1350	490	22.0	40.0	23.0	15.0	Y	Y	N	Y	Y	N	

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379	08-15-90	5656.5	1175	460	10.0	44.0	26.0	20.0	Y	Y	Y	Y	Y	Y	
380	08-15-90	5654.9	1790	450	14.0	38.0	28.0	20.0	Y	Y	Y	Y	Y	Y	
381	08-16-90	5653.0	1690	415	16.0	37.0	27.0	20.0	Y	Y	Y	Y	Y	Y	
385	08-17-90	5656.2	1680	495	5.0	35.0	35.0	25.0	Y	N	Y	Y	Y	N	RW,RT
385A	08-17-90	5656.2	1680	495	5.0	35.0	35.0	25.0	Y	Y	Y	Y	Y	Y	
386	08-17-90	5657.8	1300	500	13.0	45.0	25.0	17.0	Y	Y	Y	Y	Y	Y	
387A	08-18-90	5660.5	1300	500	14.0	42.0	27.0	17.0	Y	Y	Y	Y	Y	Y	
388	08-18-90	5658.3	1640	450	14.0	41.0	28.0	17.0	N	Y	Y	Y	Y	N	OLD
389	08-18-90	5659.0	1600	480	11.0	52.0	21.0	16.0	Y	Y	Y	Y	Y	Y	
390	08-20-90	5662.0	1205	350	4.0	36.0	28.0	32.0	Y	Y	Y	Y	Y	Y	
391	08-20-90	5657.2	1800	400	7.0	34.0	34.0	25.0	Y	Y	Y	Y	Y	Y	
393	08-20-90	5660.9	1500	500	12.0	43.0	26.0	19.0	Y	Y	Y	Y	Y	Y	
396	08-20-90	5660.0	1500	400	16.0	41.0	27.0	16.0	Y	N	Y	Y	Y	N	OLM
397	08-21-90	5660.5	1625	450	22.0	34.0	26.0	18.0	Y	N	N	Y	Y	N	OLM
398	08-21-90	5664.8	1160	450	10.0	40.0	29.0	21.0	Y	Y	Y	Y	Y	Y	
401	08-21-90	5670.0	2350	400	11.0	50.0	24.0	15.0	Y	Y	Y	Y	Y	Y	
403	08-21-90	5662.0	1200	480	12.0	47.0	24.0	17.0	Y	Y	Y	Y	Y	Y	
405	08-22-90	5664.2	1435	470	18.0	42.0	25.0	15.0	Y	Y	Y	Y	Y	Y	
407	08-22-90	5663.5	1710	450	8.0	37.0	33.0	22.0	Y	Y	Y	Y	Y	Y	
408	08-23-90	5671.4	2370	450	7.0	41.0	30.0	22.0	Y	Y	Y	Y	Y	Y	
409	08-23-90	5667.0	1640	485	18.0	34.0	29.0	19.0	Y	Y	Y	Y	Y	Y	
410	08-23-90	5670.0	2225	350	16.0	49.0	21.0	14.0	Y	Y	Y	Y	Y	Y	
411	08-23-90	5663.0	1750	420	13.0	42.0	33.0	12.0	Y	Y	Y	Y	Y	Y	
412	08-24-90	5669.0	1250	500	18.0	43.0	24.0	15.0	Y	N	Y	Y	Y	N	OLM
413	08-24-90	5672.6	2250	365	9.0	46.0	26.0	19.0	Y	Y	Y	Y	Y	Y	
415	08-24-90	5665.7	1700	490	22.0	48.0	19.0	11.0	Y	Y	N	Y	Y	N	
416	08-25-90	5668.0	1520	420	21.0	35.0	26.0	18.0	Y	Y	N	Y	Y	N	
419	08-27-90	5672.4	2235	310	7.0	45.0	21.0	27.0	Y	Y	Y	Y	Y	Y	
420	08-27-90	5675.7	2350	415	10.0	44.0	28.0	18.0	Y	Y	Y	Y	Y	Y	
421	08-27-90	5670.4	1305	465	16.0	41.0	24.0	19.0	Y	Y	Y	Y	Y	Y	
422	08-27-90	5675.0	2340	375	10.0	45.0	26.0	19.0	Y	Y	Y	Y	Y	Y	
423	08-28-90	5671.0	1565	520	18.0	45.0	22.0	15.0	Y	Y	Y	Y	Y	Y	
424	08-28-90	5670.2	1550	500	22.0	45.0	19.0	14.0	Y	Y	N	Y	Y	N	
425	08-28-90	5670.0	1515	435	14.0	44.0	24.0	18.0	Y	N	Y	Y	Y	N	OLM
426	08-29-90	5674.8	1250	500	12.0	37.0	27.0	24.0	N	Y	Y	Y	Y	N	OLD
427	08-29-90	5677.9	1150	350	8.0	40.0	25.0	27.0	N	Y	Y	Y	Y	N	OLD
428	08-29-90	5676.5	2300	310	9.0	44.0	26.0	21.0	Y	Y	Y	Y	Y	Y	
429	08-30-90	5678.0	1400	450	14.0	34.0	29.0	23.0	Y	Y	Y	Y	Y	Y	
430	08-31-90	5675.0	1600	400	12.0	37.0	30.0	21.0	Y	Y	Y	Y	Y	Y	
431	09-05-90	5660.0	1950	450	12.0	31.0	32.0	25.0	Y	N	Y	Y	Y	N	OLM
432	09-04-90	5677.0	1145	405	7.0	42.0	25.0	26.0	Y	Y	Y	Y	Y	Y	
433	09-05-90	5679.0	1440	445	14.0	44.0	20.0	22.0	Y	Y	Y	Y	Y	Y	
437	09-06-90	5679.0	1250	400	20.0	35.0	24.0	21.0	Y	Y	Y	Y	Y	Y	
438	09-06-90	5661.5	1952	460	17.0	43.0	21.0	19.0	Y	Y	Y	Y	Y	Y	
439	09-07-90	5662.5	1875	405	16.0	39.0	25.0	20.0	Y	Y	Y	Y	Y	Y	
445	09-10-90	5665.5	1925	475	22.0	35.0	27.0	16.0	Y	Y	N	Y	Y	N	
448	09-11-90	5665.8	1815	430	20.0	40.0	25.0	15.0	Y	Y	Y	Y	Y	Y	
451	09-12-90	5671.0	2000	335	13.0	43.0	27.0	17.0	Y	Y	Y	Y	Y	Y	
458	09-14-90	5676.3	1950	425	13.0	33.0	27.0	27.0	Y	Y	Y	Y	Y	Y	
459	09-17-90	5674.0	1850	340	26.0	39.0	19.0	16.0	Y	Y	N	Y	Y	N	
460	09-17-90	5675.0	1750	485	11.0	40.0	30.0	19.0	Y	Y	Y	Y	Y	Y	
462	09-18-90	5679.3	1595	435	18.0	40.0	23.0	19.0	Y	Y	Y	Y	Y	Y	

QUALITY ACCEPTANCE TESTING - SPECIFICATIONS COMPARISON REPORT REPORT NUMBER: RII.0

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464	09-21-90	5682.0	1260	400	25.0	45.0	18.0	12.0	Y	Y	N	Y	Y	N	
465	09-21-90	5681.0	2270	350	9.0	43.0	25.0	23.0	Y	Y	Y	Y	Y	Y	
479	09-24-90	5683.0	2350	260	9.0	49.0	24.0	18.0	Y	Y	Y	Y	Y	Y	
482	09-25-90	5683.0	2200	390	23.0	34.0	26.0	17.0	Y	Y	N	Y	Y	N	
484	09-25-90	5683.0	1275	390	18.0	34.0	28.0	20.0	Y	Y	Y	Y	Y	Y	
486	09-26-90	5682.0	2080	400	21.0	37.0	25.0	17.0	Y	Y	N	Y	Y	N	
489	09-27-90	5686.0	2150	385	13.0	35.0	26.0	26.0	Y	Y	Y	Y	Y	Y	
493	09-28-90	5686.5	2050	425	9.0	32.0	31.0	28.0	Y	Y	Y	Y	Y	Y	
499	10-01-90	5688.0	1200	405	20.0	31.0	24.0	25.0	Y	Y	Y	Y	Y	Y	
500	10-01-90	5685.5	2350	350	23.0	36.0	22.0	19.0	Y	Y	N	Y	Y	N	
503	10-02-90	5686.3	1625	400	13.0	37.0	28.0	22.0	Y	Y	Y	Y	Y	Y	
506	10-04-90	5690.1	2150	375	16.0	40.0	24.0	20.0	Y	Y	Y	Y	Y	Y	
520	10-09-90	5593.0	1540	175	17.0	***28.0***	31.0	24.0	Y	Y	Y	N	Y	N	RW,RT
528	10-11-90	5592.6	1525	175	13.0	42.0	25.0	20.0	Y	Y	Y	Y	Y	Y	
544	10-17-90	5593.0	1450	125	17.0	41.0	25.0	17.0	Y	Y	Y	Y	Y	Y	
571	10-26-90	5585.0	1550	70	26.0	35.0	22.0	17.0	Y	Y	N	Y	Y	N	
576	10-27-90	5585.9	1500	97	19.0	43.0	21.0	17.0	Y	Y	Y	Y	Y	Y	
592	10-30-90	5591.0	1475	100	14.0	33.0	23.0	30.0	N	Y	Y	Y	Y	N	RW,RT
598	10-31-90	5679.0	1752	480	14.0	50.0	20.0	16.0	Y	Y	Y	Y	Y	Y	
592A	10-31-90	5592.5	1425	85	1.0	45.0	25.0	29.0	Y	Y	Y	Y	Y	Y	
586	10-29-90	5588	1565	150	14.0	46.0	22.0	18.0	Y	Y	Y	Y	Y	Y	
946	07-23-91	5599.1	1450	70	24.0	36.0	21.5	18.5	N	Y	N	Y	Y	N	OLD
959	07-25-91	5605.7	1565	156	20.0	40.0	25.0	15.0	Y	Y	Y	Y	Y	Y	
973	07-26-91	5603.1	1450	110	12.0	33.0	23.0	32.0	Y	Y	Y	Y	Y	Y	
982	07-29-91	5607.6	1450	182	10.0	35.0	28.0	27.0	Y	Y	Y	Y	Y	Y	
999	07-31-91	5605.7	1380	180	21.0	48.0	16.0	15.0	N	N	N	Y	Y	N	RM
1006	08-02-91	5612.5	1400	200	17.0	34.0	25.0	24.0	Y	Y	Y	Y	Y	Y	
1010	08-02-91	5614.5	1450	133	11.0	34.0	26.0	29.0	Y	Y	Y	Y	Y	Y	
1023	08-06-91	5619.5	1550	140	11.0	32.0	31.0	26.0	Y	Y	Y	Y	Y	Y	
1028	08-06-91	5620.7	1500	110	14.0	32.0	27.0	27.0	Y	Y	Y	Y	Y	Y	
1038	08-07-91	5621.5	1545	78	21.0	36.0	23.0	20.0	Y	N	N	Y	Y	N	OLM
1049	08-08-91	5623.6	1445	150	15.0	37.0	24.0	24.0	Y	Y	Y	Y	Y	Y	
1060	08-09-91	5627.0	1540	150	15.0	37.0	25.5	22.5	Y	Y	Y	Y	Y	Y	
1067	08-10-91	5617.6	1575	75	13.0	36.0	27.0	24.0	Y	Y	Y	Y	Y	Y	
1077	08-12-91	5627.4	1400	275	16.0	39.0	24.0	21.0	Y	N	N	Y	Y	N	OLM
1084	08-13-91	5631.2	1440	265	20.0	34.0	24.0	22.0	Y	Y	Y	Y	Y	Y	
1087	08-14-91	5624.4	1591	286	8.0	31.0	25.0	36.0	Y	Y	Y	Y	Y	Y	
1099	08-16-91	5632.8	1625	95	7.0	30.0	21.0	42.0	Y	Y	N	Y	Y	N	
1111	08-17-91	5633.1	1390	175	9.0	30.0	26.0	35.0	Y	Y	Y	Y	Y	Y	
1120	08-19-91	5632.2	1420	95	7.0	***21.0***	29.5	42.5	Y	Y	N	N	Y	N	
1129	08-21-91	5637.1	1585	223	12.0	33.0	22.0	33.0	Y	Y	Y	Y	Y	Y	
1140	08-21-91	5641.0	1635	235	14.0	***29.0***	27.0	30.0	Y	Y	Y	N	Y	N	
1150	08-22-91	5639.6	1400	165	16.0	37.0	19.0	28.0	Y	Y	Y	Y	Y	Y	
1152	08-23-91	5641.1	1675	120	18.0	31.0	26.0	25.0	Y	N	Y	Y	Y	N	OLM
1154	08-23-91	5639.6	1600	50	11.0	***29.0***	29.0	31.0	Y	Y	Y	N	Y	N	
1188	08-24-91	5643.3	1525	250	24.0	***27.0***	27.0	22.0	Y	Y	N	N	Y	N	
1235	08-29-91	5644.2	1550	250	9.0	33.0	26.0	32.0	Y	Y	Y	Y	Y	Y	
1243	08-31-91	5639.0	1330	98	17.0	30.0	20.0	33.0	Y	N	Y	Y	Y	N	OLM
1250	08-31-91	5644.3	1370	220	16.0	40.0	22.0	22.0	Y	Y	Y	Y	Y	Y	
1252	08-31-91	5647.8	1650	350	25.0	35.0	17.0	23.0	Y	Y	N	Y	Y	N	
1256	09-03-91	5646.3	1400	286	6.0	36.0	24.0	34.0	Y	Y	Y	Y	Y	Y	
1259	09-03-91	5643.9	1550	90	7.0	41.0	19.0	33.0	Y	Y	Y	Y	Y	Y	

TEST NUMBER	DATE	ELEV	LOCATION STATION	OFFSET	% COBBL	% GRAV	% SAND	% FINES	% COMPACTION DESIGN >= 95%	MOISTURE IN SPEC -3 %- 1 %	GRADATION IN SPEC	GRAVELS IN SPEC > %	FINES IN SPEC < 45 %	TEST IN SPEC	STATUS FAILED TESTS
1262	09-04-91	5648.5	1530	300	2.0	***23.0***	23.7	***51.3***	Y	Y	N	N	N	N	RM
1275	09-05-91	5649.6	1530	300	14.0	39.0	20.0	27.0	Y	Y	Y	Y	Y	Y	
1314	09-18-91	5650.3	1400	270	9.0	39.0	23.0	29.0	Y	N	Y	Y	Y	N	OLM
1318	09-19-91	5653.0	1557	264	13.0	***28.0***	22.0	37.0	Y	Y	Y	N	Y	N	
1324	09-20-91	5650.3	1300	180	15.0	40.0	19.0	26.0	Y	Y	Y	Y	Y	Y	
1330	09-22-91	5656.6	1585	380	16.0	38.0	18.0	28.0	Y	Y	Y	Y	Y	Y	
1334	09-22-91	5652.4	1450	130	14.0	***25.0***	21.0	40.0	Y	N	Y	N	Y	N	RW,RT
1338	09-23-91	5651.3	2000	100	12.0	46.0	19.5	22.5	Y	Y	Y	Y	Y	Y	
1334A	09-24-91	5651.6	1450	130	8.0	40.0	22.0	30.0	Y	Y	Y	Y	Y	Y	
1350	09-25-91	5653.6	1561	61	14.0	36.0	24.0	26.0	Y	Y	Y	Y	Y	Y	RW,RT
1350A	09-25-91	5653.6	1561	61	14.0	36.0	24.0	26.0	Y	Y	Y	Y	Y	Y	
1358	09-26-91	5660.3	1700	330	7.0	***24.0***	21.0	***48.0***	Y	Y	N	N	N	N	RW,RT
1358A	09-28-91	5659.1	1695	335	10.0	40.0	25.5	24.5	N	Y	Y	Y	Y	N	OLD
1360A	09-29-91	5658.0	1620	210	8.0	37.0	29.0	26.0	Y	Y	Y	Y	Y	Y	
1368	09-30-91	5658.1	1600	88	8.0	42.0	23.0	27.0	N	Y	Y	Y	Y	N	RW,RT
1368A	10-01-91	5657.9	1597	91	8.0	42.0	23.0	27.0	Y	Y	Y	Y	Y	Y	
1372	10-01-91	5659.4	1512	296	14.0	40.0	18.5	27.5	Y	Y	Y	Y	Y	Y	
1376	10-01-91	5659.9	1972	117	9.0	43.0	20.0	28.0	Y	Y	Y	Y	Y	Y	
1391	10-03-91	5660.0	1707	184	8.0	38.0	20.0	34.0	N	N	Y	Y	Y	N	OLD,M
1396	10-04-91	5660.0	1515	88	7.0	***27.0***	27.0	39.0	Y	Y	Y	N	Y	N	RW,RT
1401	10-05-91	5660.8	1445	240	12.0	32.0	19.0	37.0	Y	Y	Y	Y	Y	Y	
1396A	10-05-91	5660.0	1515	95	9.0	43.0	22.5	25.5	Y	Y	Y	Y	Y	Y	
1407	10-06-91	5662.9	1959	165	6.0	***26.0***	24.0	44.0	Y	Y	N	N	Y	N	
1414	10-07-91	5665.1	1878	300	9.0	32.0	26.0	33.0	Y	Y	Y	Y	Y	Y	
1419	10-08-91	5663.2	1485	175	8.0	45.0	25.0	22.0	N	Y	Y	Y	Y	N	OLD
1428	10-10-91	5667.1	1615	315	15.0	43.0	21.0	21.0	Y	Y	Y	Y	Y	Y	
1452	10-11-91	5666.8	1985	292	12.0	36.0	22.0	30.0	Y	N	Y	Y	Y	N	OLM
1456	10-11-91	5663.1	1383	173	7.0	47.0	20.0	26.0	Y	Y	Y	Y	Y	Y	
1462	10-12-91	5664.4	2088	200	11.0	35.0	17.0	37.0	Y	Y	Y	Y	Y	Y	
1464	10-13-91	5664.3	2120	63	12.0	32.0	26.0	30.0	Y	Y	N	Y	Y	N	
1467	10-14-91	5668.1	1489	317	24.0	35.0	19.0	22.0	Y	N	N	Y	Y	N	OLM
1470	10-16-91	5668.7	2102	275	10.0	35.0	26.0	29.0	Y	Y	Y	Y	Y	Y	
1472	10-16-91	5669.0	1969	277	13.0	39.0	24.0	24.0	Y	Y	Y	Y	Y	Y	
1483	10-17-91	5668.7	1335	325	6.0	32.0	28.0	34.0	Y	Y	Y	Y	Y	Y	
1491	10-18-91	5675.4	1700	404	20.0	37.0	18.0	25.0	Y	Y	Y	Y	Y	Y	
1493	10-19-91	5668.5	1431	94	16.0	31.0	23.0	30.0	Y	Y	Y	Y	Y	Y	
1499	10-21-91	5668.7	1550	224	16.0	34.0	27.0	23.0	Y	Y	Y	Y	Y	Y	
1513	03-16-92	5675.9	1550	362	10.0	***29.0***	27.0	34.0	Y	Y	Y	N	Y	N	
1552	03-31-92	5675.0	1500	280	14.0	***25.0***	25.0	36.0	Y	Y	Y	N	Y	N	
1565	04-03-92	5672.5	1550	165	16.0	***28.0***	27.0	29.0	Y	Y	N	N	Y	N	RW,RT
1567	04-06-92	5674.5	1800	170	15.0	***24.0***	25.0	36.0	-	-	N	N	Y	N	RW,RT
1565A	04-06-92	5672.1	1560	170	16.0	***28.0***	27.0	29.0	Y	Y	N	N	Y	N	
1574	04-07-92	5681.7	1550	380	2.0	44.0	21.0	33.0	N	Y	Y	Y	Y	N	OLD
1567A	04-08-92	5674.5	1800	170	11.0	***23.0***	28.0	38.0	Y	Y	Y	N	Y	N	
1585	04-09-92	5673.4	2050	180	18.0	***26.0***	22.0	34.0	Y	Y	N	N	Y	N	
1602	04-10-92	5674.0	1925	105	9.0	37.0	24.0	30.0	Y	Y	Y	Y	Y	Y	
1609	04-14-92	5677.9	1950	244	10.0	38.0	22.0	30.0	N	N	Y	Y	Y	N	RW,RT
1618	04-25-92	5678.4	1950	244	6.0	30.0	25.0	39.0	Y	Y	Y	Y	Y	Y	
1629	04-25-92	5677.3	1950	138	23.0	40.0	20.5	16.5	Y	Y	N	Y	Y	N	
1643	04-27-92	5677.2	1570	249	20.0	43.0	22.0	15.0	Y	Y	Y	Y	Y	Y	
1644	04-26-92	5681.0	1381	401	10.0	39.0	25.0	26.0	Y	Y	Y	Y	Y	Y	
1656	04-28-92	5676.5	1303	181	8.0	34.0	27.0	31.0	Y	Y	Y	Y	Y	Y	

TEST NUMBER	DATE	ELEV	LOCATION STATION	LOCATION OFFSET	% COBBL	% GRAV	% SAND	% FINES	% COMPACTION DESIGN >= 95%	MOISTURE IN SPEC -3 %- 1 %	GRADATION IN SPEC	GRAVELS IN SPEC > %	FINES IN SPEC < 45 %	TEST IN SPEC	STATUS FAILED TESTS
1662	04-29-92	5677.5	2252	161	12.0	41.0	25.0	22.0	Y	Y	Y	Y	Y	Y	
1671	04-30-92	5676.6	2101	291	15.0	45.0	21.0	19.0	Y	Y	Y	Y	Y	Y	
1677	05-02-92	5679.8	1660	223	20.0	33.0	23.0	24.0	Y	Y	Y	Y	Y	Y	
1679	05-02-92	5682.0	1550	260	16.0	33.0	25.0	26.0	Y	N	Y	Y	Y	N	OLM
1681	05-02-92	5685.6	1348	367	13.0	39.0	24.0	24.0	Y	Y	Y	Y	Y	Y	
1685	05-02-92	5683.0	2075	265	14.0	48.0	20.0	18.0	Y	Y	Y	Y	Y	Y	
1689	05-04-92	5684.5	1975	270	20.0	30.0	22.0	28.0	Y	N	Y	Y	Y	N	OLM
1691	05-05-92	5681.0	1775	195	19.0	31.0	24.0	26.0	Y	Y	N	Y	Y	N	
1697	05-06-92	5682.7	1839	126	15.0	33.0	25.0	27.0	Y	Y	N	Y	Y	N	
1698	05-06-92	5680.0	1606	78	16.0	42.0	22.0	20.0	Y	Y	N	Y	Y	N	
1704	05-10-92	5684.7	2050	205	10.0	36.0	28.0	26.0	Y	Y	Y	Y	Y	Y	
1713	05-14-92	5681.8	1450	140	7.0	41.0	25.0	27.0	Y	Y	Y	Y	Y	Y	
1714	05-12-92	5686.7	1450	350	15.0	***25.0***	24.0	36.0	-	-	Y	N	Y	N	RW,RT
1714A	05-13-92	5686.7	1500	315	10.0	***28.0***	27.0	35.0	Y	Y	Y	N	Y	N	
1719	05-14-92	5685.4	2270	75	19.0	31.0	28.0	22.0	Y	Y	Y	Y	Y	Y	RW,RT
1722	05-15-92	5682.4	1300	121	20.0	34.0	23.0	23.0	Y	Y	N	Y	Y	N	
1719A	05-15-92	5685.1	2270	75	19.0	31.0	28.0	22.0	Y	Y	Y	Y	Y	Y	
1733	05-17-92	5687.8	1909	184	5.0	54.0	26.0	15.0	N	N	Y	Y	Y	N	OLD,M
1735	05-18-92	5687.1	1300	280	16.0	***26.0***	25.0	33.0	Y	Y	N	N	Y	N	
1739	05-19-92	5687.3	1800	63	12.0	31.0	22.0	35.0	Y	Y	Y	Y	Y	Y	
1740	05-20-92	5688.2	2100	196	5.0	30.0	26.0	39.0	Y	Y	Y	Y	Y	Y	
1743	05-26-92	5687.2	1600	180	14.0	33.0	22.0	31.0	Y	Y	N	Y	Y	N	
1748	05-27-92	5686.9	1550	75	8.0	***28.0***	27.0	37.0	Y	Y	Y	N	Y	N	
1749	05-27-92	5687.6	1700	190	14.0	36.0	25.0	25.0	Y	Y	Y	Y	Y	Y	
1758	05-28-92	5687.3	1400	185	18.0	***28.0***	26.0	28.0	Y	Y	N	N	Y	N	
1763	05-29-92	5692.8	1650	340	27.0	***26.0***	22.0	25.0	Y	N	N	N	Y	N	RW,RT
1765	05-29-92	5689.7	1750	140	16.0	***29.0***	25.0	30.0	Y	Y	Y	N	Y	N	
1769	05-30-92	5689.7	1700	50	4.0	43.0	29.0	24.0	Y	Y	Y	Y	Y	Y	
1771	05-30-92	5691.2	1825	212	14.0	35.0	29.0	22.0	Y	Y	N	Y	Y	N	RW,RT
1763A	05-29-92	5692.1	1650	340	27.0	***26.0***	22.0	25.0	Y	Y	N	N	Y	N	
1775	06-01-92	5690.4	2050	55	16.0	32.0	23.0	29.0	Y	Y	Y	Y	Y	Y	
1777	06-01-92	5690.7	2306	340	21.0	35.0	21.0	23.0	Y	Y	N	Y	Y	N	
1771A	05-31-92	5691.3	1825	212	14.0	35.0	29.0	22.0	Y	Y	N	Y	Y	N	
1781	06-01-92	5690.1	1620	95	9.0	34.0	30.0	27.0	Y	Y	Y	Y	Y	Y	
1785	06-01-92	5692.4	1550	340	11.0	31.0	27.0	31.0	Y	Y	Y	Y	Y	Y	
1789	06-03-92	5692.1	2150	200	14.0	45.0	23.0	18.0	Y	Y	Y	Y	Y	Y	
1790	06-03-92	5690.4	1550	110	15.0	36.0	25.0	24.0	Y	Y	N	Y	Y	N	
1795	06-04-92	5692.0	2190	240	18.0	33.0	26.0	23.0	N	Y	N	Y	Y	N	OLD
1800	06-05-92	5691.1	1382	90	16.0	44.0	16.0	24.0	Y	N	N	Y	Y	N	OLM
1802	06-05-92	5693.7	2200	120	13.0	39.0	19.0	29.0	Y	Y	Y	Y	Y	Y	
1808	06-06-92	5693.3	2327	67	8.0	35.0	24.0	33.0	Y	Y	Y	Y	Y	Y	
1812	06-08-92	5694.0	1240	31	13.0	35.0	25.0	27.0	Y	Y	Y	Y	Y	Y	
1813	06-08-92	5695.3	2175	135	16.0	***28.0***	28.0	28.0	Y	Y	Y	N	Y	N	
1816	06-08-92	5696.3	2352	240	16.0	***28.0***	24.0	32.0	Y	Y	Y	N	Y	N	
1823	06-10-92	5696.3	1450	300	20.0	38.0	17.0	25.0	Y	N	N	Y	Y	N	OLM
1824	06-10-92	5694.4	1450	50	29.0	31.0	20.0	20.0	Y	Y	N	Y	Y	N	
1835	06-10-92	5696.3	2020	265	8.0	33.0	23.0	36.0	Y	Y	Y	Y	Y	Y	
1841	06-11-92	5698.9	1800	323	9.0	39.0	26.0	26.0	Y	N	Y	Y	Y	N	OLM
1842	06-12-92	5697.7	1800	100	20.0	34.0	23.0	23.0	Y	Y	N	Y	Y	N	
1844	06-13-92	5698.8	1700	240	8.0	34.0	26.0	32.0	Y	N	N	Y	Y	N	OLM
1849	06-13-92	5696.7	1450	75	18.0	33.0	24.0	25.0	N	N	Y	Y	Y	N	RW,RT
1851	06-18-92	5696.4	1500	150	8.0	30.0	31.0	31.0	Y	Y	Y	Y	Y	Y	

TEST NUMBER	DATE	ELEV	LOCATION STATION	LOCATION OFFSET	% COBBL	% GRAV	% SAND	% FINES	% COMPACTION DESIGN >= 95%	MOISTURE IN SPEC -3 %- 1 %	GRADATION IN SPEC	GRAVELS IN SPEC > %	FINES IN SPEC < 45 %	TEST IN SPEC	STATUS FAILED TESTS
1849A	06-18-92	5696.7	1450	75	11.0	34.0	26.0	29.0	Y	Y	Y	Y	Y	Y	
1853	06-18-92	5696.4	1300	282	5.0	33.0	29.0	33.0	Y	Y	N	Y	Y	N	RW,RT
1853A	06-19-92	5699.0	1300	282	5.0	33.0	29.0	33.0	Y	Y	N	Y	Y	N	
1861	06-20-92	5700.4	2050	290	14.0	35.0	24.0	27.0	Y	Y	Y	Y	Y	Y	
1865	06-21-92	5699.4	1500	260	7.0	30.0	27.0	36.0	Y	Y	Y	Y	Y	Y	
1868	06-22-92	5700.6	1900	240	22.0	32.0	24.0	22.0	Y	N	N	Y	Y	N	OLM
1870	06-22-92	5699.7	1352	120	6.0	41.0	19.0	34.0	Y	Y	Y	Y	Y	Y	
1878	06-23-92	5701.4	1430	277	14.0	31.0	26.0	29.0	Y	Y	N	Y	Y	N	
1880	06-24-92	5702.1	1487	177	12.0	34.0	18.0	36.0	Y	Y	Y	Y	Y	Y	
1886	06-25-92	5703.6	2050	146	16.0	32.0	23.0	29.0	Y	Y	Y	Y	Y	Y	
1890	06-25-92	5705.1	1865	225	31.0	***26.0***	20.0	23.0	Y	Y	N	N	Y	N	
1895	06-25-92	5702.2	1262	60	11.0	34.0	17.0	38.0	Y	Y	N	Y	Y	N	
1897	06-26-92	5705.0	2250	205	13.0	30.0	26.0	31.0	Y	Y	Y	Y	Y	Y	
1898	06-26-92	5705.7	1800	70	6.0	36.0	20.0	38.0	Y	Y	Y	Y	Y	Y	
1900	06-27-92	5706.6	1625	75	13.0	35.0	20.0	32.0	Y	N	Y	Y	Y	N	OLM
1901	06-27-92	5706.1	1900	280	12.0	***29.0***	27.0	32.0	Y	Y	Y	N	Y	N	
1908	06-28-92	5708.3	2050	76	6.0	***29.0***	18.0	***47.0***	Y	N	N	N	N	N	OLM
1910	06-28-92	5705.0	2305	315	21.0	***28.0***	25.0	26.0	Y	Y	N	N	Y	N	
1917	06-29-92	5705.1	1255	230	22.0	32.0	24.0	22.0	N	Y	N	Y	Y	N	OLD
1920	06-29-92	5707.8	2205	70	11.0	36.0	17.0	36.0	N	N	Y	Y	Y	N	OLD,M
1923	07-02-92	5707.7	1200	290	13.0	***27.0***	25.0	35.0	Y	Y	N	N	Y	N	
1933	07-03-92	5711.2	1561	55	8.0	37.0	17.0	38.0	Y	Y	Y	Y	Y	Y	
1935	07-03-92	5707.9	1400	267	31.0	30.0	19.0	20.0	Y	Y	N	Y	Y	N	
1940	07-06-92	5712.2	1680	280	14.0	37.0	25.0	24.0	N	Y	Y	Y	Y	N	OLD
1941	07-06-92	5710.1	2300	95	7.0	48.0	20.0	25.0	Y	Y	N	Y	Y	N	
1942	07-06-92	5707.5	1244	167	10.0	***29.0***	28.0	33.0	Y	Y	Y	N	Y	N	
1946A	07-07-92	5710.7	1300	280	12.0	42.0	21.0	25.0	Y	Y	Y	Y	Y	Y	
1953	07-08-92	5710.7	1550	215	30.0	***26.0***	19.0	25.0	Y	Y	N	N	Y	N	
1956	07-08-92	5711.2	2246	57	14.0	34.0	21.0	31.0	Y	Y	Y	Y	Y	Y	
1960	07-09-92	5712.7	2171	256	16.0	32.0	31.0	21.0	Y	N	Y	Y	Y	N	OLM
1964	07-09-92	5716.1	1500	70	8.0	32.0	25.0	35.0	Y	Y	Y	Y	Y	Y	
1967	07-10-92	5717.7	1915	80	8.0	37.0	26.0	29.0	Y	Y	Y	Y	Y	Y	
1969	07-10-92	5709.7	2375	240	22.0	40.0	20.0	18.0	Y	Y	N	Y	Y	N	
1972	07-11-92	5717.2	1760	135	8.0	33.0	27.0	32.0	Y	Y	Y	Y	Y	Y	
1973	07-14-92	5716.7	1850	260	16.0	36.0	25.0	23.0	Y	Y	N	Y	Y	N	
1977	07-15-92	5717.6	1630	50	21.0	31.0	24.0	24.0	Y	Y	N	Y	Y	N	
1979	07-15-92	5717.3	2125	280	5.0	50.0	27.0	18.0	Y	Y	Y	Y	Y	Y	
1981	07-16-92	5719.4	1800	200	4.0	32.0	29.0	35.0	Y	Y	Y	Y	Y	Y	
1984	07-17-92	5717.6	1920	115	4.0	32.0	31.0	33.0	Y	Y	Y	Y	Y	Y	
1986	07-16-92	5716.9	2242	276	4.0	41.0	31.0	24.0	Y	Y	Y	Y	Y	Y	
1990	07-17-92	5723.0	1880	130	13.0	***27.0***	26.0	34.0	Y	Y	Y	N	Y	N	
1996	07-18-92	5716.6	2463	64	8.0	34.0	32.0	26.0	Y	Y	Y	Y	Y	Y	
1998	07-18-92	5717.8	1240	180	7.0	36.0	30.0	27.0	Y	Y	Y	Y	Y	Y	
2004	07-18-92	5720.5	2090	54	11.0	34.0	29.0	26.0	Y	Y	Y	Y	Y	Y	
2007	07-19-92	5722.7	1752	190	9.0	33.0	30.0	28.0	N	N	Y	Y	Y	N	OLD,M
2009	07-20-92	5722.3	2282	182	9.0	43.0	26.0	22.0	Y	Y	Y	Y	Y	Y	
2015	07-21-92	5725.3	1850	43	9.0	45.0	25.0	21.0	Y	Y	N	Y	Y	N	
2019	07-21-92	5719.5	2239	45	7.0	42.0	27.0	24.0	Y	Y	Y	Y	Y	Y	
2022	07-22-92	5722.7	1300	104	8.0	46.0	25.0	21.0	Y	Y	Y	Y	Y	Y	
2026	07-22-92	5725.0	1748	132	8.0	39.0	28.0	25.0	Y	Y	Y	Y	Y	Y	
2029	07-22-92	5722.2	2336	111	8.0	31.0	27.0	34.0	Y	Y	Y	Y	Y	Y	
2030	07-23-92	5727.4	1681	217	6.0	***28.0***	28.0	38.0	Y	Y	N	N	Y	N	

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2031	07-23-92	5723.4	1184	135	20.0	***27.0***	24.0	29.0	Y	N	N	N	Y	N	RW
2034	07-23-92	5724.4	1300	70	11.0	36.0	30.0	23.0	Y	Y	Y	Y	Y	Y	
2039	07-24-92	5728.2	2008	70	12.0	***27.0***	27.0	34.0	Y	N	N	N	Y	N	OLM
2041	07-27-92	5726.8	2150	70	14.0	31.0	28.0	27.0	Y	Y	Y	Y	Y	Y	
2053	07-28-92	5728.5	1550	105	19.0	30.0	26.0	25.0	Y	N	Y	Y	Y	N	OLM
2062	07-29-92	5730.6	2050	196	16.0	32.0	28.0	24.0	Y	Y	Y	Y	Y	Y	
2076	07-30-92	5731.0	1426	52	9.0	42.0	25.0	24.0	Y	Y	Y	Y	Y	Y	
2078	07-31-92	5730.6	1462	220	18.0	***26.0***	29.0	27.0	Y	N	N	N	Y	N	OLM
2083	07-31-92	5729.5	2350	65	17.0	***29.0***	28.0	26.0	Y	N	N	N	Y	N	OLM
2085	08-01-92	5731.6	1300	48	17.0	***27.0***	28.0	28.0	Y	Y	Y	N	Y	N	
2089	08-02-92	5731.8	1300	150	15.0	30.0	27.0	28.0	N	Y	N	Y	Y	N	OLD
2092	08-02-92	5735.9	2050	60	7.0	35.0	30.0	28.0	Y	N	Y	Y	Y	N	OLM
2104	08-04-92	5733.3	1300	194	8.0	33.0	29.0	30.0	Y	Y	Y	Y	Y	Y	
2109	08-04-92	5734.2	2350	70	12.0	32.0	26.0	30.0	Y	N	Y	Y	Y	N	OLM
2111	08-05-92	5734.7	1375	204	16.0	36.0	29.0	19.0	Y	Y	Y	Y	Y	Y	
2117	08-05-92	5734.7	1200	40	16.0	***27.0***	26.0	31.0	Y	N	Y	N	Y	N	OLM
2121	08-06-92	5735.0	2350	157	8.0	***29.0***	26.0	37.0	Y	Y	N	N	Y	N	
2122	08-06-92	5739.3	1700	50	26.0	31.0	22.0	21.0	Y	Y	N	Y	Y	N	
2123	08-07-92	5735.0	1243	201	17.0	33.0	27.0	23.0	Y	Y	N	Y	Y	N	
2126	08-07-92	5735.2	2500	69	3.0	35.0	30.0	32.0	Y	N	Y	Y	Y	N	OLM
2128	08-08-92	5740.8	1625	105	4.0	38.0	37.0	21.0	Y	Y	Y	Y	Y	Y	
2129	08-10-92	5739.4	1719	176	11.0	31.0	31.0	27.0	Y	Y	Y	Y	Y	Y	
2133	08-11-92	5736.7	1174	150	24.0	30.0	24.0	22.0	N	N	N	Y	Y	N	OLD,M
2138	08-11-92	5739.0	1360	200	8.0	32.0	30.0	30.0	Y	Y	Y	Y	Y	Y	
2139	08-11-92	5736.1	2548	73	23.0	30.0	24.0	23.0	Y	N	N	Y	Y	N	OLM
2142	08-12-92	5740.4	1157	77	25.0	34.0	20.0	21.0	Y	Y	N	Y	Y	N	
2147	08-13-92	5740.5	1409	181	11.0	41.0	26.0	22.0	Y	N	Y	Y	Y	N	OLM
2148	08-13-92	5740.6	2400	80	11.0	35.0	33.0	21.0	Y	N	Y	Y	Y	N	OLM
2162	08-13-92	5741.4	2150	185	9.0	41.0	25.0	25.0	Y	Y	Y	Y	Y	Y	
2165	08-14-92	5742.0	1500	80	14.0	41.0	28.0	17.0	Y	Y	Y	Y	Y	Y	
2174	08-14-92	5742.4	1400	120	13.0	35.0	30.0	22.0	Y	Y	Y	Y	Y	Y	
2177	08-14-92	5742.3	2150	177	26.0	***26.0***	24.0	24.0	Y	Y	N	N	Y	N	
2179	08-15-92	5743.3	2245	91	18.0	***27.0***	33.0	22.0	Y	Y	N	N	Y	N	
2184	08-15-92	5740.4	2400	196	5.0	***23.0***	29.0	43.0	Y	N	N	N	Y	N	OLM
2185	08-16-92	5743.2	2448	110	16.0	44.0	23.0	17.0	Y	N	Y	Y	Y	N	RW
2190	08-18-92	5747.2	1600	42	21.0	31.0	22.0	26.0	Y	Y	N	Y	Y	N	
2187	08-17-92	5745.4	2040	190	13.0	***26.0***	23.0	38.0	Y	Y	Y	N	Y	N	
2198	08-19-92	5748.9	1815	60	8.0	***28.0***	20.0	44.0	Y	N	N	N	Y	N	OLM
2201	08-20-92	5747.4	1398	90	15.0	33.0	25.3	26.7	Y	Y	Y	Y	Y	Y	
2207	08-21-92	5747.7	2403	72	17.0	32.0	18.0	33.0	Y	Y	Y	Y	Y	Y	
2208	08-21-92	5748.6	1230	140	23.0	31.0	21.9	24.1	Y	Y	N	Y	Y	N	RW
2211	08-22-92	5750.9	2050	49	13.0	33.0	28.9	25.1	Y	Y	Y	Y	Y	Y	
2214	08-22-92	5749.9	2319	37	11.0	31.0	26.3	31.7	Y	Y	N	Y	Y	N	
2216	08-23-92	5752.5	1770	87	10.0	***26.0***	28.1	35.9	Y	Y	Y	N	Y	N	
2217	08-23-92	5750.5	1285	35	10.0	32.0	29.5	28.5	Y	Y	N	Y	Y	N	
2220	08-24-92	5753.1	1550	61	14.0	30.0	31.2	24.8	Y	Y	Y	Y	Y	Y	
2221	08-24-92	5754.6	1729	139	9.0	45.0	25.0	21.0	Y	Y	Y	Y	Y	Y	RM
2225	08-25-92	5751.3	1350	150	18.0	30.0	23.0	29.0	Y	Y	Y	Y	Y	Y	
2233	08-26-92	5756.3	1168	62	19.0	***29.0***	31.0	21.0	Y	Y	N	N	Y	N	
2226A	08-27-92	5754.7	1925	66	4.0	42.0	29.0	25.0	Y	Y	Y	Y	Y	Y	
2238	08-27-92	5756.7	1550	115	11.0	33.0	30.0	26.0	Y	Y	Y	Y	Y	Y	
2239	08-27-92	5758.6	1715	54	17.0	39.0	26.0	18.0	Y	Y	Y	Y	Y	Y	

QUALITY ACCEPTANCE TESTING - SPECIFICATIONS COMPARISON REPORT REPORT NUMBER: RII.0

TEST NUMBER	DATE	ELEV	LOCATION STATION	LOCATION OFFSET	% COBBL	% GRAV	% SAND	% FINES	% COMPACTION DESIGN >= 95%	MOISTURE IN SPEC -3 %- 1 %	GRADATION IN SPEC	GRAVELS IN SPEC > %	FINES IN SPEC < 45 %	TEST IN SPEC	STATUS FAILED TESTS
2241	08-28-92	5757.4	1260	50	18.0	33.0	31.0	18.0	Y	Y	Y	Y	Y	Y	
2246	08-28-92	5757.1	1247	147	32.0	***25.0***	23.0	20.0	Y	Y	N	N	Y	N	
2250	08-29-92	5759.6	1603	77	15.0	32.0	28.0	25.0	Y	Y	Y	Y	Y	Y	
2253	08-29-92	5759.6	1427	72	14.0	36.0	28.0	22.0	Y	Y	Y	Y	Y	Y	
2254	08-30-92	5760.9	1134	72	6.0	33.0	34.0	27.0	Y	N	Y	Y	Y	N	OLM
2260	09-01-92	5763.9	1550	40	4.0	34.0	29.0	33.0	Y	Y	Y	Y	Y	Y	
2263	09-02-92	5760.7	2135	35	22.0	***28.0***	25.0	25.0	Y	Y	N	N	Y	N	
2268	09-02-92	5759.0	2350	142	21.0	***25.0***	32.0	22.0	Y	Y	N	N	Y	N	
2270	09-02-92	5769.2	1390	47	20.0	31.0	24.0	25.0	Y	Y	Y	Y	Y	Y	
2271	09-03-92	5765.6	1115	46	23.0	31.0	25.0	21.0	Y	N	N	Y	Y	N	RM
2274	09-03-92	5763.5	2563	56	20.0	33.0	26.0	21.0	Y	Y	N	Y	Y	N	
2277	09-08-92	5762.5	2350	127	13.0	32.0	25.0	30.0	Y	Y	Y	Y	Y	Y	
2282	09-09-92	5772.0	1550	95	9.0	35.0	28.0	28.0	Y	Y	Y	Y	Y	Y	
2299	09-11-92	5772.4	1800	95	24.0	30.0	24.0	22.0	Y	Y	N	Y	Y	N	
2309	09-13-92	5775.7	1122	90	13.0	30.0	29.0	28.0	Y	Y	Y	Y	Y	Y	
2312	09-14-92	5779.2	1300	84	18.0	***26.0***	25.0	31.0	Y	Y	Y	N	Y	N	
2328	09-17-92	5784.8	1292	65	14.0	34.0	22.0	30.0	Y	Y	Y	Y	Y	Y	
2344	09-20-92	5788.8	1156	46	6.0	38.0	21.0	35.0	Y	Y	Y	Y	Y	Y	
2349	09-21-92	5790.0	1105	44	15.0	***27.0***	25.0	33.0	N	Y	Y	N	Y	N	OLD
2356	09-23-92	5793.5	2024	47	13.0	***25.0***	29.0	33.0	Y	Y	N	N	Y	N	
2360	09-24-92	5794.5	1300	43	18.0	30.0	25.0	27.0	Y	N	Y	Y	Y	N	OLM
2369	09-25-92	5795.7	1209	37	14.0	38.0	26.0	22.0	Y	N	Y	Y	Y	N	OLM
2374	09-27-92	5801.3	1880	25	8.0	30.0	26.0	36.0	Y	Y	Y	Y	Y	Y	
2377	09-29-92	5802.5	2388	24	11.0	***22.0***	24.0	43.0	Y	Y	N	N	Y	N	
2387	10-02-92	5807.6	1425	21	11.0	36.0	25.0	28.0	Y	Y	Y	Y	Y	Y	
2393	10-07-92	5812.1	1064	12	26.0	32.0	19.0	23.0	Y	Y	N	Y	Y	N	
2396	10-09-92	5813.9	1944	3	25.0	31.0	22.0	22.0	Y	Y	N	Y	Y	N	
2398	10-10-92	5812.9	2775	6	21.0	***26.0***	23.0	30.0	Y	Y	N	N	Y	N	

NOTE: These statistics include only results of tests that are NOT designated as RM, RW, or RW,RT.

	% COMPACTION	MOISTURE	GRADATION	GRAVELS	FINES	TEST IN SPEC
FAILING TEST LOCATIONS	28	55	119	67	1	192
PASSING TEST LOCATIONS	419	392	328	380	446	255
TOTAL TEST LOCATIONS	447	447	447	447	447	447
% FAILING TEST LOCATIONS	6.3	12.3	26.6	15.0	0.2	43.0

REMARKS LEGEND

RM - Test Location Removed
RW - Test Loc. Reworked and NOT Retested
RW,RT - Test Loc. Reworked and Retested
AR - Additional Rolling at Test Location

TEST LOCATIONS REWORKED - UNTESTED..	4
TEST LOCATIONS REWORKED - RETESTED..	29
TEST LOCATIONS REMOVED.............	7
FAILED TEST LOCATIONS NOT REWORKED OR RETESTED..	192
PERCENT OF FAILED TEST LOCATIONS NOT REWORKED OR RETESTED IN PERMANENT FILL..	43.0

COMMENT: THIS REPORT COVERS THE ENTIRE CONSTRUCTION OF THE DAM.

LAB CHIEF: ______________________

SUBMITTED BY: ______________________
PROJECT ENGINEER

QUALITY ACCEPTANCE TESTING - GRADATIONS REPORT

REPORT NUMBER: RII.1

PROJECT: LITTLE DELL LAKE, DAM AND APPURTENANCES RIVER: SALT LAKE CITY STREAMS STATE: UTAH TOWN: SALT LAKE CITY	CONTRACT NO. DACW05-89-C-0045 CONTRACTOR: CLEMENT BROTHERS AND J.E. STARNES CO.	DATE OF REPORT: 12-07-92 01-01-90 THRU 12-31-92

EMBANKMENT ZONE	MIN. DESIGNED % COMP	SPEC. W.C. % RANGE	LOOSE LIFT THICK. (IN)	NUMBER OF PASSES	COMPACTION EQUIPMENT
RANDOM II	95	-3 TO 1	12	5	SD1500, SD150F, SP60

TEST NUMBER	DATE	ELEV	LOCATION		GRADATION - PERCENT PASSING										LL	PI	CLASSIFICATION
			STATION	OFFSET	8 IN	3 IN	1 IN	3/4IN	3/8IN	# 4	# 10	# 40	#100	#200			
103	04-20-90	5644.0	2175	207	100.0	100.0	82.9	78.3	69.4	63.0	57.0	49.6	42.5	34.9			GC WITH SA
110	05-02-90	5645.0	2150	218	100.0	90.7	77.9	74.9	66.5	61.0	56.3	49.9	42.0	31.5	27.0	14.0	SC WITH GR & CE
112	05-03-90	5654.0	2260	320	100.0	90.4	76.9	74.6	67.4	63.7	57.1	51.7	42.6	30.0	30.0	16.0	SC WITH GR & CB
113	05-05-90	5657.0	2256	352	100.0	100.0	90.5	89.1	86.2	***83.3***	***80.2***	***75.5***	***64.1***	42.6			SC WITH GR
115	05-07-90	5658.0	2258	360	***95.3***	85.1	76.0	73.4	68.2	62.2	57.4	51.5	46.1	38.5	30.0	17.0	SC WITH GR
119	05-09-90	5661.0	2250	284	100.0	93.5	77.4	73.6	63.1	51.4	42.7	32.9	21.8	8.4			GP-GC W SA & CB
120	05-09-90	5663.0	2304	419	100.0	91.9	73.0	68.2	60.1	51.0	46.7	42.6	37.6	29.7	29.0	15.0	GC WITH SA
127	05-11-90	5666.0	2255	345	100.0	95.9	86.6	83.7	76.0	***70.8***	***65.8***	***61.3***	***52.6***	38.8	23.5	4.0	SC-SM WITH GR
129	05-16-90	5665.1	2250	290	***97.9***	93.7	82.9	80.5	73.4	***70.7***	***66.0***	***61.9***	***55.2***	44.4	28.0	16.0	SC WITH GR
131	05-17-90	5666.5	2235	330	100.0	86.0	66.4	62.0	51.8	44.8	38.7	31.0	22.8	16.7			GC WITH SA & CB
132	05-17-90	5668.5	2400	498	***94.6***	***78.8***	58.1	54.0	45.8	39.9	34.9	29.4	22.9	17.7			GC WITH SA & CB
133	05-18-90	5668.5	2247	355	100.0	84.8	68.6	65.1	56.7	49.4	44.3	38.3	32.0	24.0	27.0	12.0	GC WITH SA & CB
134	05-19-90	5669.0	2350	386	100.0	95.6	75.3	70.1	57.7	48.1	42.2	34.9	26.7	17.1			GC WITH SA & CB
135	05-22-90	5596.5	1351	578	100.0	96.2	76.9	70.5	59.6	52.3	47.3	41.0	31.0	21.1	22.0	6.0	GC-GM WITH SA
138	05-24-90	5601.0	1331	630	100.0	88.9	73.8	70.0	60.8	50.0	45.1	39.0	30.6	24.5	29.0	12.0	GC WITH SA & CB
142	05-25-90	5597.4	1331	475	100.0	88.6	78.4	74.3	65.9	60.0	54.6	47.6	40.5	31.4			GC WITH SA & CB
146	05-28-90	5602.6	1332	711	100.0	94.6	80.3	77.5	70.3	64.0	59.4	53.7	46.7	35.5	27.0	11.0	GC WITH SA & CB
142A	05-26-90	5597.4	1331	475	100.0	96.7	80.2	75.4	65.5	59.2	53.6	46.9	39.2	29.9			GC WITH SA & CB
150	05-29-90	5602.5	1389	668	100.0	86.8	67.0	61.8	51.0	45.0	39.8	33.5	26.3	18.3			GC WITH SA & CB
151	05-29-90	5602.5	1375	679	100.0	88.8	76.8	72.7	62.3	55.9	51.0	45.2	37.6	28.7			GC WITH SA & CB
153	06-04-90	5598.0	1350	476	100.0	87.4	71.3	67.2	59.5	53.6	46.2	37.4	27.9	18.2			SC WITH GR & CB
154	06-04-90	5600.5	1240	500	100.0	82.7	68.3	65.2	58.5	53.1	48.4	42.9	36.2	26.8			GC WITH SA & CB
159	06-06-90	5604.0	1353	585	100.0	95.6	77.2	72.8	63.7	57.0	51.6	46.2	38.5	28.6	28.0	13.0	GC WITH SA
160	06-06-90	5605.2	1207	586	100.0	92.4	82.1	78.9	69.0	62.4	57.2	52.2	45.8	37.3			GC WITH SA
161	06-07-90	5603.5	1309	602	***94.3***	80.5	65.5	61.7	52.7	45.7	40.4	34.2	26.0	18.3	23.0	6.0	GC-GM W SA & CB
162	06-07-90	5603.7	1351	641	100.0	81.3	62.4	58.8	50.8	45.2	40.5	35.0	27.1	21.6	23.0	6.0	GC-GM W SA & CB
163	06-08-90	5598.3	1937	583	100.0	***79.1***	59.8	55.4	48.2	43.1	38.3	33.1	25.0	16.7			GC WITH SA & CB
164	06-08-90	5605.0	1264	506	100.0	84.4	66.9	63.0	55.6	50.0	45.8	40.6	31.3	22.4			GC WITH SA & CB
170	06-12-90	5597.1	1418	364	100.0	91.5	77.7	73.3	64.5	58.6	53.5	46.9	36.5	27.6			GC WITH SA & CB
174	06-12-90	5595.5	1373	390	100.0	93.5	70.5	65.5	56.6	50.0	44.8	38.9	29.9	21.5			GC WITH SA & CB
177	06-13-90	5597.0	1339	292	100.0	***73.3***	55.3	52.1	45.5	40.1	35.3	29.6	22.4	14.7			GC WITH CB & SA
178	06-13-90	5597.7	1417	381	100.0	81.0	57.1	51.5	43.0	36.7	31.4	25.2	17.7	11.7			GW-GC W SA & CB
180	06-14-90	5610.0	1257	663	100.0	***78.4***	***54.8***	49.4	40.7	33.8	29.3	22.4	15.8	10.6	24.0	3.0	GW-GM W SA & CB
181	06-14-90	5605.4	1271	437	100.0	***66.1***	***53.0***	49.9	43.9	39.8	31.0	25.8	18.4	11.8			GP-GC W SA & CB
188	06-18-90	5599.3	1324	398	100.0	84.9	67.0	63.4	55.5	49.8	45.2	39.6	32.6	24.4			GC WITH SA & CB
196	06-20-90	5608.2	1355	605	100.0	87.5	77.1	73.4	63.7	55.1	47.8	39.2	30.5	21.0			SC WITH GR & CB
197	06-20-90	5608.4	1248	534	100.0	92.6	76.6	71.0	61.8	54.2	47.4	39.1	30.9	21.0			GC WITH SA & CB
198	06-20-90	5603.1	1302	400	100.0	87.2	67.2	63.1	54.7	48.8	43.4	36.5	27.6	19.0			GC WITH SA & CB
199	06-21-90	5614.4	1223	650	100.0	84.2	63.9	60.6	54.1	48.3	44.5	39.2	32.0	23.8			GC WITH SA & CB
200	06-21-90	5612.3	1188	462	100.0	95.1	80.5	76.4	66.7	59.1	51.9	43.8	34.2	24.9			GC WITH SA
201	06-21-90	5608.0	1310	528	100.0	90.9	75.1	70.9	60.5	50.0	40.5	30.6	23.9	17.8	24.0	6.0	GC-GM W SA & CB
206	06-22-90	5613.0	1278	678	100.0	93.6	77.5	72.5	64.8	59.5	54.7	47.7	39.8	30.7	27.0	13.0	GC WITH SA & CB
212	06-25-90	5607.0	1305	417	100.0	82.2	63.3	59.0	50.6	45.4	40.8	35.0	27.6	19.0			GC WITH SA & CB

TEST NUMBER	DATE	ELEV	LOCATION		GRADATION - PERCENT PASSING										LL	PI	CLASSIFICATION
			STATION	OFFSET	8 IN	3 IN	1 IN	3/4IN	3/8IN	# 4	# 10	# 40	#100	#200			
214	06-25-90	5608.0	1370	574	100.0	88.7	72.6	68.5	60.4	53.9	49.0	42.4	32.9	22.3	23.5	6.5	GC-GM W SA & CB
215	06-25-90	5610.0	1279	652	***78.7***	***76.2***	59.2	55.4	49.2	44.0	39.3	33.1	25.0	17.2			GC WITH SA & CB
218	06-26-90	5604.0	1414	307	100.0	83.7	63.6	60.2	51.7	45.9	40.8	34.1	26.8	19.2			GC WITH SA & CB
219	06-26-90	5610.0	1250	636	***96.9***	83.6	69.3	65.4	56.8	49.8	44.3	37.5	28.7	19.8	24.0	6.0	GC-GM W SA & CB
220	06-26-90	5609.5	1375	655	100.0	***70.2***	57.8	53.6	44.4	38.1	32.0	24.7	18.2	12.2			GC WITH CB & SA
221	06-27-90	5603.3	1375	300	100.0	92.7	78.5	74.1	66.2	59.2	52.5	44.5	36.2	27.0			GC WITH SA & CB
222	06-27-90	5608.2	1362	450	***95.2***	80.9	67.1	63.9	55.0	48.5	42.5	35.6	28.4	20.3	30.0	16.0	GC WITH SA & CB
223	06-27-90	5603.5	1425	270	100.0	90.8	72.7	67.3	57.1	49.1	41.7	34.0	27.8	20.7			GC WITH SA & CB
224	06-27-90	5607.2	1360	364	100.0	82.2	68.2	64.5	56.1	49.6	44.1	38.1	31.6	22.3			GC WITH SA & CB
225	06-28-90	5609.2	1310	522	100.0	89.1	74.8	71.9	65.1	58.3	52.4	45.0	37.6	28.3	32.0	20.0	GC WITH SA & CB
226	06-28-90	5608.6	1389	465	100.0	89.6	64.8	58.8	47.6	40.3	34.5	27.7	21.4	14.8			GC WITH SA & CB
228	06-28-90	5609.0	1290	415	100.0	***79.3***	63.1	59.9	51.5	45.1	39.2	31.7	23.8	16.9	26.0	11.0	GC WITH SA & CB
229	06-28-90	5615.5	1268	643	100.0	92.2	70.3	66.0	58.6	52.5	47.3	40.9	33.0	25.2			GC WITH SA & CB
230	06-29-90	5612.8	1325	550	***95.0***	***79.8***	66.9	64.2	56.6	51.0	45.9	39.5	30.2	22.5	25.0	9.0	GC WITH SA & CB
231	06-29-90	5611.2	1270	470	100.0	82.7	68.2	64.8	56.9	51.7	46.7	40.3	31.7	23.1			GC WITH SA & CB
159A	06-07-90	5601.0	1360	590	100.0	95.6	77.2	72.8	63.7	57.0	51.6	46.2	38.5	28.6	28.0	13.0	GC WITH SA
232	07-04-90	5615.5	1300	586	100.0	91.9	69.7	65.8	58.2	52.4	47.6	41.7	32.7	24.0	26.0	11.0	GC WITH SA & CB
235	07-05-90	5611.3	1302	432	100.0	84.1	70.3	66.4	58.7	52.5	47.4	41.0	33.4	26.7	29.5	15.5	GC WITH SA & CB
237	07-06-90	5615.5	1325	550	100.0	***79.1***	59.9	56.3	50.3	46.3	42.2	37.7	30.6	24.4	31.0	17.0	GC WITH SA & CB
238	07-06-90	5619.5	1343	635	100.0	***75.4***	62.0	59.4	52.2	48.0	44.0	39.5	33.6	26.7			GC WITH CB & SA
239	07-07-90	5619.5	1260	629	100.0	88.4	79.4	75.9	68.4	62.0	55.4	44.5	34.1	24.5			SC WITH GR & CB
240	07-07-90	5611.4	1375	329	100.0	91.3	76.0	72.1	62.7	54.8	48.1	39.0	29.9	22.1	22.0	8.0	GC WITH SA & CB
244	07-07-90	5619.8	1312	545	100.0	84.5	69.2	62.9	50.9	44.2	38.4	30.8	22.1	16.2	24.0	8.0	GC WITH SA & CB
255	07-11-90	5618.0	1295	360	100.0	98.3	92.2	90.4	84.0	***78.9***	***73.0***	***63.5***	***54.0***	39.6			SC WITH GR
261	07-12-90	5626.0	1250	620	100.0	96.4	84.8	81.9	74.9	68.9	64.2	***56.6***	47.6	36.1			SC WITH GR
277	07-18-90	5601.4	1460	575	100.0	81.0	56.0	51.0	42.0	36.0	32.0	26.0	21.0	16.0	23.0	7.0	GC-GM W SA & CB
278	07-18-90	5604.5	1470	680	100.0	92.0	68.0	64.0	54.0	48.0	43.0	36.0	29.0	22.0			GC WITH SA & CB
279	07-18-90	5601.0	1460	500	100.0	89.0	60.0	54.0	44.0	39.0	34.0	28.0	21.0	16.0			GC WITH SA & CB
280	07-19-90	5600.0	1463	475	100.0	81.0	56.0	51.0	41.0	36.0	32.0	26.0	20.0	15.0	22.0	7.0	GC-GM W SA & CB
281	07-19-90	5593.3	1488	245	100.0	90.0	68.0	62.0	52.0	47.0	42.0	35.0	27.0	21.0			GC WITH SA & GR
282	07-19-90	5598.0	1481	318	100.0	94.0	84.0	82.0	68.0	67.0	61.0	55.0	48.0	38.0	31.0	15.0	SC WITH GR & CB
283	07-19-90	5611.0	1445	700	100.0	93.0	80.0	76.0	68.0	62.0	57.0	52.0	45.0	35.0			GC WITH SA & CB
284	07-20-90	5601.0	1486	363	100.0	93.0	79.0	75.0	58.0	51.0	46.0	41.0	35.0	28.0	30.0	18.0	GC WITH SA & CB
286	07-21-90	5601.0	1480	270	100.0	87.0	78.0	74.0	61.0	55.0	50.0	46.0	39.0	30.0	26.0	10.0	GC WITH SA & CB
287	07-21-90	5608.0	1459	510	100.0	90.0	78.0	74.0	62.0	56.0	51.0	46.0	38.0	31.0	29.0	17.0	GC WITH SA & CB
288	07-21-90	5603.7	1480	329	100.0	93.0	77.0	75.0	69.0	62.0	56.0	50.0	42.0	33.0			GC WITH SA & CB
290	07-21-90	5616.7	1478	677	100.0	89.0	80.0	75.0	65.0	58.0	54.0	48.0	41.0	34.0			GC WITH SA & CB
294	07-22-90	5620.5	1430	721	100.0	95.0	85.0	81.0	72.0	64.0	58.0	43.0	36.0	26.0	30.0	15.0	SC WITH GR & CB
296	07-22-90	5618.1	1328	588	100.0	***79.0***	64.0	61.0	53.0	46.0	41.0	34.0	27.0	20.0	26.0	10.0	GC WITH SA & CB
297	07-23-90	5613.5	1560	415	100.0	85.0	66.0	62.0	56.0	50.0	44.0	35.0	26.0	19.0	25.0	5.0	GC-GM W SA & CB
299	07-24-90	5609.3	1483	290	100.0	82.2	66.8	61.6	51.6	44.1	38.3	30.6	22.9	15.7	24.0	6.0	GC-GM W SA & CB
301	07-24-90	5621.8	1363	654	100.0	***78.0***	65.0	61.0	53.0	47.0	42.0	35.0	28.0	20.0			GC WITH SA & CB
305	07-24-90	5614.5	1415	290	100.0	85.0	66.0	62.0	54.0	47.0	41.0	31.0	21.0	12.0	26.0	8.0	GP-GC W SA & CB
306	07-25-90	5619.0	1350	500	100.0	87.0	66.0	62.0	52.0	46.0	40.0	33.0	25.0	19.0	25.0	7.0	GC-GM W SA & CB
307	07-25-90	5617.0	1250	400	100.0	90.0	78.0	73.0	63.0	55.0	48.0	39.0	30.0	21.0			GC WITH SA & CB
310	07-26-90	5618.5	1420	357	100.0	***77.0***	59.0	54.0	45.0	40.0	35.0	29.0	23.0	17.0			GC WITH SA & CB
311	07-26-90	5615.0	1500	320	100.0	87.0	69.0	63.0	53.0	47.0	42.0	34.0	26.0	18.0	25.0	7.0	GC-GM W SA & CB
312	07-26-90	5617.0	1440	485	100.0	85.0	70.0	68.0	60.0	54.0	49.0	40.0	30.0	22.0	25.0	8.0	SC WITH GR & CB
313	07-26-90	5623.7	1455	655	100.0	80.0	59.0	54.0	46.0	42.0	37.0	31.0	25.0	18.0	27.0	11.0	GC WITH SA & CB
322	07-28-90	5626.0	1500	310	100.0	92.0	78.0	74.0	65.0	58.0	52.0	44.0	34.0	25.0	26.0	16.0	GC WITH SA & CB
314	07-26-90	5624.7	1300	555	***99.0***	85.0	70.0	67.0	61.0	56.0	50.0	42.0	33.0	24.0	26.0	8.0	SC WITH GR & CB
315	07-26-90	5620.8	1310	310	100.0	94.0	85.0	83.0	78.0	***74.0***	***70.0***	***64.0***	***56.0***	43.0			SC WITH GR & CB

TEST NUMBER	DATE	ELEV	LOCATION		GRADATION - PERCENT PASSING										LL	PI	CLASSIFICATION
			STATION	OFFSET	8 IN	3 IN	1 IN	3/4IN	3/8IN	# 4	# 10	# 40	#100	#200			
316	07-27-90	5620.8	1590	390	100.0	93.0	75.0	72.0	64.0	58.0	53.0	46.0	39.0	29.0			GC WITH SA & CB
317	07-27-90	5620.7	1500	477	100.0	88.0	64.0	58.0	47.0	41.0	35.0	28.0	21.0	15.0	23.0	8.0	GC WITH SA & CB
319	07-27-90	5626.0	1368	603	100.0	**79.0**	60.0	56.0	49.0	44.0	39.0	33.0	26.0	19.0	28.0	11.0	GC WITH SA & CB
320	07-28-90	5628.0	1415	500	100.0	86.0	68.0	64.0	55.0	48.0	43.0	36.0	27.0	19.0	25.0	8.0	GC WITH SA & CB
321	07-28-90	5629.0	1215	539	100.0	92.0	69.0	66.0	59.0	53.0	48.0	42.0	33.0	26.0			GC WITH SA & CB
323	07-28-90	5622.8	1443	360	100.0	84.0	58.0	53.0	44.0	38.0	34.0	28.0	21.0	16.0	24.0	7.0	GC-GM W SA & CB
326	07-29-90	5624.8	1510	600	100.0	81.0	65.0	61.0	51.0	44.0	39.0	32.0	25.0	18.0			GC WITH SA & CB
324A	07-30-90	5626.2	1354	410	100.0	84.0	63.0	59.0	49.0	43.0	39.0	33.0	24.0	16.0	22.0	4.0	GC-GM W SA & CB
329	07-30-90	5631.5	1304	570	100.0	88.0	69.0	64.0	54.0	47.0	42.0	35.0	27.0	21.0	25.0	9.0	GC WITH SA & CB
330	07-30-90	5628.3	1600	385	100.0	94.0	83.0	78.0	70.0	62.0	56.0	48.0	39.0	28.0			SC WITH GR & CB
331	07-31-90	5631.7	1450	600	100.0	**79.0**	61.0	57.0	49.0	43.0	39.0	32.0	25.0	18.0	24.0	7.0	GC-GM W SA & CB
334	07-31-90	5632.6	1350	500	100.0	86.0	59.0	54.0	43.0	37.0	32.0	26.0	20.0	15.0	24.0	7.0	GC-GM W SA & CB
335	07-31-90	5629.0	1539	328	100.0	90.0	71.0	68.0	60.0	54.0	49.0	42.0	33.0	24.0	23.0	6.0	GC-GM W SA & CB
336	08-01-90	5633.0	1384	455	100.0	88.0	63.0	58.0	47.0	41.0	36.0	29.0	22.0	16.0	25.0	8.0	GC WITH SA & CB
337	08-01-90	5629.5	1325	300	100.0	**79.0**	59.0	53.0	44.0	39.0	34.0	28.0	22.0	16.0	28.0	10.0	GC WITH SA & CB
339	08-01-90	5634.1	1455	450	100.0	88.0	69.0	66.0	59.0	53.0	47.0	40.0	32.0	24.0	30.0	16.0	GC WITH SA & CB
340	08-01-90	5636.3	1223	400	100.0	89.0	67.0	63.0	54.0	47.0	41.0	34.0	26.0	18.0			GC WITH SA & CB
341	08-02-90	5636.5	1285	450	100.0	82.0	**50.0**	**45.0**	38.0	34.0	30.0	24.0	19.0	13.0	23.0	6.0	GC-GM W SA & CB
342	08-02-90	5638.0	1210	400	100.0	84.0	74.0	71.0	65.0	60.0	56.0	50.0	43.0	34.0			SC WITH GR & CB
343	08-02-90	5638.5	1500	550	100.0	**78.0**	57.0	51.0	42.0	37.0	33.0	27.0	20.0	15.0	24.0	7.0	GC-GM W SA & CB
344	08-03-90	5639.0	1450	425	100.0	84.0	66.0	61.0	51.0	44.0	39.0	33.0	26.0	19.0			GC WITH SA & CB
345	08-03-90	5638.4	1400	548	100.0	89.0	62.0	56.0	47.0	40.0	36.0	29.0	22.0	16.0	24.0	8.0	GC WITH SA & CB
346	08-03-90	5639.7	1550	550	100.0	87.0	78.0	75.0	68.0	61.0	56.0	48.0	40.0	31.0	30.0	13.0	SC WITH GR & CB
347	08-04-90	5639.0	1350	375	100.0	83.0	68.0	66.0	60.0	55.0	50.0	42.0	34.0	25.0	30.0	14.0	SC WITH GR & CB
347A	08-04-90	5641.1	1413	532	100.0	92.0	78.0	72.0	52.0	41.0	33.0	27.0	21.0	15.0			GC WITH SA & CB
348	08-06-90	5639.9	1435	484	100.0	87.0	67.0	65.0	59.0	54.0	48.0	39.0	30.0	19.0	27.0	10.0	SC WITH GR & CB
349	08-06-90	5639.0	1346	400	100.0	86.0	65.0	60.0	51.0	44.0	39.0	32.0	25.0	19.0	26.0	8.0	GC WITH SA & CB
350	08-07-90	5639.5	1550	350	100.0	86.0	71.0	68.0	60.0	54.0	49.0	41.0	33.0	25.0	30.0	12.0	GC WITH SA & CB
350A	08-07-90	5640.8	1573	400	100.0	89.5	73.6	70.4	57.2	48.4	42.9	36.3	28.6	22.0			GC WITH SA & CB
351	08-07-90	5642.5	1650	410	100.0	87.0	77.0	74.0	66.0	62.0	53.0	44.0	35.0	26:0	30.0	13.0	SC WITH GR & CB
352	08-08-90	5644.4	1600	550	100.0	89.0	71.0	66.0	57.0	51.0	45.0	39.0	30.0	23.0	28.0	12.0	GC WITH SA & CB
350B	08-08-90	5641.7	1573	376	100.0	91.0	78.0	75.0	65.0	54.0	48.0	31.0	26.0	25.0			SC WITH GR & CB
351A	08-08-90	5643.7	1560	515	100.0	89.0	63.0	60.0	48.0	39.0	33.0	27.0	21.0	15.0	26.0	8.0	GC WITH SA & CB
353	08-09-90	5640.4	1508	377	100.0	88.0	68.0	63.0	47.0	38.0	32.0	27.0	21.0	15.0	24.0	7.0	GC-GM W SA & CB
354	08-09-90	5645.1	1437	498	**99.0**	89.0	72.0	67.0	56.0	49.0	43.0	35.0	27.0	20.0	26.0	8.0	GC WITH SA & CB
355	08-09-90	5646.8	1420	460	100.0	88.0	68.0	63.0	51.0	44.0	39.0	32.0	24.0	17.0	27.0	7.0	GC-GM W SA & CB
356	08-10-90	5647.7	1575	470	100.0	85.0	71.0	66.0	55.0	47.0	41.0	34.0	27.0	20.0	26.0	9.0	GC WITH SA & CB
357	08-10-90	5649.3	1705	450	100.0	100.0	81.0	77.0	67.0	59.0	52.0	44.0	35.0	26.0			GC WITH SA
358	08-10-90	5648.1	1642	510	100.0	88.0	62.0	58.0	49.0	42.0	37.0	30.0	21.0	16.0	26.0	8.0	GC WITH SA & CB
359	08-10-90	5645.6	1287	398	100.0	85.0	66.0	61.0	52.0	45.0	39.0	31.0	23.0	17.0	24.0	6.0	GC-GM W SA & CB
361	08-10-90	5648.2	1500	470	100.0	88.0	73.0	68.0	58.0	51.0	45.0	38.0	30.0	22.0	29.0	13.0	GC WITH SA & CB
362	08-11-90	5650.0	1329	500	100.0	84.0	68.0	64.0	54.0	47.0	42.0	35.0	28.0	21.0	29.0	14.0	GC WITH SA & CB
363	08-11-90	5645.0	1680	429	100.0	88.0	68.0	63.0	54.0	48.0	43.0	34.0	26.0	19.0	25.0	8.0	GC WITH SA & CB
364	08-12-90	5650.0	1350	470	100.0	83.0	61.0	55.0	46.0	40.0	36.0	30.0	21.0	16.0	26.0	10.0	GC WITH SA & CB
365	08-12-90	5649.0	1560	450	100.0	80.0	**52.0**	**47.0**	38.0	33.0	29.0	24.0	18.0	13.0			GC WITH SA & CB
366	08-12-90	5648.5	1330	385	100.0	81.0	55.0	50.0	40.0	33.0	29.0	24.0	18.0	13.0			GC WITH SA & CB
367	08-13-90	5649.3	1426	435	100.0	90.0	70.0	66.0	56.0	49.0	43.0	35.0	27.0	19.0	24.0	6.0	GC-GM W SA & CB
369	08-14-90	5653.0	1575	450	100.0	90.0	72.0	68.0	59.0	52.0	46.0	39.0	30.0	21.0	25.0	10.0	GC WITH SA & CB
374	08-15-90	5668.4	2313	400	100.0	82.0	70.0	66.0	57.0	50.0	44.0	36.0	29.0	23.0			SC WITH GR & CB
375	08-15-90	5667.9	2225	297	100.0	99.0	88.0	87.0	81.0	**73.0**	**67.0**	**60.0**	**49.0**	38.0			SC WITH GR & CB
376	08-15-90	5653.6	1625	460	**98.0**	**79.0**	60.0	56.0	49.0	43.0	38.0	31.0	24.0	18.0	26.0	9.0	GC WITH SA & CB
378	08-15-90	5656.0	1350	490	**98.0**	**78.0**	58.0	54.0	44.0	38.0	34.0	28.0	21.0	15.0	25.0	7.0	GC-GM W SA & CB

TEST NUMBER	DATE	ELEV	LOCATION		GRADATION - PERCENT PASSING										LL	PI	CLASSIFICATION
			STATION	OFFSET	8 IN	3 IN	1 IN	3/4IN	3/8IN	# 4	# 10	# 40	#100	#200			
379	08-15-90	5656.5	1175	460	100.0	90.0	68.0	63.0	53.0	46.0	41.0	34.0	27.0	20.0			GC WITH SA & CB
380	08-15-90	5654.9	1790	450	100.0	86.0	67.0	63.0	54.0	48.0	42.0	35.0	27.0	20.0			GC WITH SA & CB
381	08-16-90	5653.0	1690	415	100.0	84.0	67.0	62.0	53.0	47.0	42.0	35.0	27.0	20.0	27.0	10.0	GC WITH SA & CB
385	08-17-90	5656.2	1680	495	100.0	95.0	79.0	76.0	67.0	60.0	53.0	45.0	34.0	25.0	26.0	9.0	GC WITH SA & CB
385A	08-17-90	5656.2	1680	495	100.0	95.0	79.0	76.0	67.0	60.0	53.0	45.0	34.0	25.0	26.0	11.0	GC WITH SA & CB
386	08-17-90	5657.8	1300	500	100.0	87.0	65.0	59.0	48.0	42.0	37.0	30.0	23.0	17.0	25.0	8.0	GC WITH SA & CB
387A	08-18-90	5660.5	1300	500	100.0	86.0	64.0	59.0	50.0	44.0	39.0	32.0	24.0	17.0			GC WITH SA & CB
388	08-18-90	5658.3	1640	450	100.0	86.0	65.0	60.0	50.0	45.0	39.0	32.0	23.0	17.0	23.0	7.0	GC-GM W SA & CB
389	08-18-90	5659.0	1600	480	100.0	89.0	59.0	53.0	44.0	37.0	33.0	28.0	21.0	16.0	25.0	9.0	GC WITH SA & CB
390	08-20-90	5662.0	1205	350	100.0	96.0	79.0	74.0	67.0	60.0	54.0	47.0	39.0	32.0			GC WITH SA & CB
391	08-20-90	5657.2	1800	400	100.0	93.0	80.0	77.0	66.0	59.0	53.0	43.0	33.0	25.0			SC WITH GR & CB
393	08-20-90	5660.9	1500	500	100.0	88.0	64.0	60.0	51.0	45.0	40.0	33.0	25.0	19.0	22.0	2.0	GM WITH SA & CB
396	08-20-90	5660.0	1500	400	100.0	84.0	62.0	58.0	49.0	43.0	37.0	30.0	22.0	16.0	26.0	9.0	GC WITH SA & CB
397	08-21-90	5660.5	1625	450	100.0	***78.0***	58.0	55.0	48.0	44.0	39.0	32.0	24.0	18.0	27.0	9.0	GC WITH SA & CB
398	08-21-90	5664.8	1160	450	100.0	90.0	71.0	67.0	57.0	50.0	45.0	37.0	28.0	21.0			GC WITH SA & CB
401	08-21-90	5670.0	2350	400	100.0	89.0	61.0	57.0	45.0	39.0	33.0	27.0	20.0	15.0			GC WITH SA & CB
403	08-21-90	5662.0	1200	480	100.0	88.0	64.0	58.0	46.0	41.0	37.0	31.0	24.0	17.0	27.0	10.0	GC WITH SA & CB
405	08-22-90	5664.2	1435	470	100.0	82.0	59.0	54.0	46.0	40.0	35.0	28.0	22.0	15.0	24.0	7.0	GC-GM W SA & CB
407	08-22-90	5663.5	1710	450	100.0	92.0	77.0	72.0	62.0	55.0	48.0	40.0	30.0	22.0	24.0	5.0	GC-GM W SA & CB
408	08-23-90	5671.4	2370	450	100.0	93.0	73.0	68.0	58.0	52.0	46.0	38.0	30.0	22.0			GC WITH SA & CB
409	08-23-90	5667.0	1640	485	100.0	82.0	66.0	62.0	54.0	48.0	42.0	35.0	26.0	19.0	25.0	6.0	GC-GM W SA & CB
410	08-23-90	5670.0	2225	350	100.0	84.0	55.0	50.0	40.0	35.0	31.0	25.0	19.0	14.0			GC WITH SA & CB
411	08-23-90	5663.0	1750	420	100.0	87.0	65.0	60.0	52.0	45.0	39.0	29.0	19.0	12.0	24.0	8.0	GP-GC W SA & CB
412	08-24-90	5669.0	1250	500	100.0	82.0	55.0	51.0	44.0	39.0	34.0	28.0	21.0	15.0	27.0	6.0	GC-GM W SA & CB
413	08-24-90	5672.6	2250	365	100.0	91.0	67.0	61.0	51.0	45.0	40.0	33.0	26.0	19.0			GC WITH SA & CB
415	08-24-90	5665.7	1700	490	100.0	***78.0***	***49.0***	***44.0***	***34.0***	30.0	26.0	21.0	16.0	11.0	24.0	7.0	GP-GC W SA & CB
416	08-25-90	5668.0	1520	420	***95.0***	***79.0***	60.0	57.0	50.0	44.0	39.0	33.0	25.0	18.0	26.0	8.0	GC WITH SA & CB
419	08-27-90	5672.4	2235	310	100.0	93.0	68.0	63.0	53.0	48.0	44.0	39.0	33.0	27.0			GC WITH SA & CB
420	08-27-90	5675.7	2350	415	100.0	90.0	67.0	62.0	52.0	46.0	41.0	34.0	25.0	18.0			GC WITH SA & CB
421	08-27-90	5670.4	1305	465	100.0	84.0	62.0	57.0	49.0	43.0	39.0	32.0	26.0	19.0	27.0	11.0	GC WITH SA & CB
422	08-27-90	5675.0	2340	375	100.0	90.0	67.0	62.0	51.0	45.0	40.0	33.0	26.0	19.0	25.0	7.0	GC-GM W SA & CB
423	08-28-90	5671.0	1565	520	100.0	82.0	58.0	52.0	42.0	37.0	33.0	27.0	21.0	15.0	25.0	8.0	GC WITH SA & CB
424	08-28-90	5670.2	1550	500	100.0	***78.0***	***47.0***	***44.0***	36.0	33.0	29.0	24.0	19.0	14.0			GC WITH CB & SA
425	08-28-90	5670.0	1515	435	100.0	86.0	63.0	59.0	48.0	42.0	37.0	31.0	24.0	18.0	25.0	8.0	GC WITH SA & CB
426	08-29-90	5674.8	1250	500	100.0	88.0	72.0	67.0	58.0	51.0	45.0	39.0	31.0	24.0	27.0	10.0	GC WITH SA & CB
427	08-29-90	5677.9	1150	350	100.0	92.0	71.0	66.0	58.0	52.0	48.0	42.0	35.0	27.0			GC WITH SA & CB
428	08-29-90	5676.5	2300	310	100.0	91.0	69.0	64.0	53.0	47.0	42.0	35.0	28.0	21.0			GC WITH SA & CB
429	08-30-90	5678.0	1400	450	100.0	86.0	70.0	66.0	58.0	52.0	46.0	39.0	30.0	23.0	26.0	7.0	GC-GM W SA & CB
430	08-31-90	5675.0	1600	400	100.0	88.0	69.0	65.0	58.0	51.0	47.0	40.0	30.0	21.0	27.0	10.0	GC WITH SA & CB
431	09-05-90	5660.0	1950	450	100.0	88.0	71.0	63.0	62.0	57.0	52.0	44.0	33.0	25.0	31.0	15.0	SC WITH GR & CB
432	09-04-90	5677.0	1145	405	100.0	93.0	69.0	65.0	56.0	51.0	46.0	41.0	34.0	26.0			GC WITH SA & CB
433	09-05-90	5679.0	1440	445	100.0	86.0	59.0	55.0	47.0	42.0	39.0	34.0	29.0	22.0			GC WITH SA & CB
437	09-06-90	5679.0	1250	400	100.0	80.0	63.0	59.0	50.0	45.0	40.0	34.0	28.0	21.0	28.0	12.0	GC WITH SA & CB
438	09-06-90	5661.5	1952	460	100.0	83.0	60.0	55.0	45.0	40.0	36.0	31.0	25.0	19.0			GC WITH SA & CB
439	09-07-90	5662.5	1875	405	100.0	84.0	64.0	59.0	50.0	45.0	40.0	33.0	26.0	20.0	25.0	9.0	GC WITH SA & CB
445	09-10-90	5665.5	1925	475	100.0	***78.0***	59.0	56.0	48.0	43.0	37.0	30.0	22.0	16.0	23.0	7.0	GC-GM W SA & CB
448	09-11-90	5665.8	1815	430	100.0	80.0	60.0	55.0	45.0	40.0	35.0	28.0	21.0	15.0	23.0	7.0	GC-GM W SA & CB
451	09-12-90	5671.0	2000	335	100.0	87.0	64.0	60.0	50.0	44.0	39.0	32.0	24.0	17.0	25.0	9.0	GC WITH SA & CB
458	09-14-90	5676.3	1950	425	100.0	87.0	71.0	67.0	59.0	54.0	49.0	43.0	36.0	27.0			GC WITH SA & CB
459	09-17-90	5674.0	1850	340	100.0	***74.0***	***52.0***	***48.0***	40.0	35.0	31.0	26.0	21.0	16.0			GC WITH CB & SA
460	09-17-90	5675.0	1750	485	100.0	89.0	69.0	64.0	55.0	49.0	43.0	35.0	27.0	19.0	25.0	6.0	GC-GM W SA & CB
462	09-18-90	5679.3	1595	435	100.0	82.0	58.0	54.0	47.0	42.0	37.0	32.0	25.0	19.0	27.0	11.0	GC WITH SA & CB

TEST NUMBER	DATE	ELEV	LOCATION STATION	OFFSET	GRADATION - PERCENT PASSING 8 IN	3 IN	1 IN	3/4IN	3/8IN	# 4	# 10	# 40	#100	#200	LL	PI	CLASSIFICATION
464	09-21-90	5682.0	1260	400	100.0	***75.0***	***46.0***	***42.0***	35.0	30.0	27.0	22.0	16.0	12.0			GP-GC W CB & SA
465	09-21-90	5681.0	2270	350	100.0	91.0	70.0	64.0	55.0	48.0	44.0	38.0	30.0	23.0	28.0	14.0	GC WITH SA & CB
479	09-24-90	5683.0	2350	260	100.0	91.0	65.0	59.0	49.0	42.0	38.0	32.0	25.0	18.0			GC WITH SA & CB
482	09-25-90	5683.0	2200	390	100.0	***77.0***	61.0	58.0	49.0	43.0	38.0	31.0	24.0	17.0	24.0	7.0	GC-GM W SA & CB
484	09-25-90	5683.0	1275	390	100.0	82.0	65.0	61.0	55.0	48.0	43.0	36.0	28.0	20.0	25.0	8.0	GC WITH SA & CB
486	09-26-90	5682.0	2080	400	100.0	***79.0***	62.0	58.0	49.0	42.0	38.0	31.0	24.0	17.0	24.0	5.0	GC-GM W SA & CB
489	09-27-90	5686.0	2150	385	100.0	87.0	72.0	68.0	58.0	52.0	47.0	40.0	33.0	26.0	29.0	15.0	GC WITH SA & CB
493	09-28-90	5686.5	2050	425	100.0	91.0	77.0	73.0	64.0	59.0	53.0	46.0	38.0	28.0	29.0	13.0	GC WITH SA & CB
499	10-01-90	5688.0	1200	405	100.0	80.0	63.0	61.0	54.0	49.0	45.0	39.0	33.0	25.0	28.0	12.0	GC WITH SA & CB
500	10-01-90	5685.5	2350	350	100.0	***77.0***	59.0	55.0	46.0	41.0	37.0	31.0	25.0	19.0	25.0	9.0	GC WITH CB & SA
503	10-02-90	5686.3	1625	400	100.0	87.0	69.0	65.0	57.0	50.0	44.0	38.0	30.0	22.0	24.0	6.0	GC-GM W SA & CB
506	10-04-90	5690.1	2150	375	100.0	84.0	65.0	60.0	50.0	44.0	40.0	33.0	26.0	20.0	24.0	6.0	GC-GM W SA & CB
520	10-09-90	5593.0	1540	175	100.0	83.0	71.0	68.0	61.0	55.0	49.0	41.0	32.0	24.0	23.0	5.0	SC-SM W GR & CB
528	10-11-90	5592.6	1525	175	100.0	87.0	64.0	61.0	52.0	45.0	40.0	34.0	27.0	20.0	25.0	8.0	GC WITH SA & CB
544	10-17-90	5593.0	1450	125	100.0	83.0	60.0	56.0	47.0	42.0	37.0	31.0	24.0	17.0			GC WITH SA & CB
571	10-26-90	5585.0	1550	70	100.0	***74.0***	***52.0***	49.0	43.0	39.0	35.0	29.0	22.0	17.0			GC WITH CB & SA
576	10-27-90	5585.9	1500	97	100.0	81.0	58.0	53.0	43.0	38.0	34.0	29.0	22.0	17.0			GC WITH SA & CB
592	10-30-90	5591.0	1475	100	100.0	86.0	71.0	67.0	58.0	53.0	49.0	44.0	38.0	30.0	31.0	15.0	GC WITH SA & CB
598	10-31-90	5679.0	1752	480	100.0	86.0	55.0	50.0	41.0	36.0	32.0	27.0	21.0	16.0			GC WITH SA & CB
592A	10-31-90	5592.5	1425	85	100.0	99.0	76.0	69.0	60.0	54.0	49.0	44.0	38.0	29.0			GC WITH SA
586	10-29-90	5588	1565	150	100.0	86.0	61.0	56.0	46.0	40.0	36.0	31.0	24.0	18.0			GM WITH SA & CB
946	07-23-91	5599.1	1450	70	***98.0***	***76.0***	55.0	53.0	45.0	40.0	35.0	29.0	23.0	18.5	25.0	8.0	GC WITH CB & SA
959	07-25-91	5605.7	1565	156	100.0	80.0	59.0	55.0	45.0	40.0	35.0	30.0	22.0	15.0	22.0	5.0	GC-GM W SA & CB
973	07-26-91	5603.1	1450	110	100.0	88.0	71.0	68.0	60.0	55.0	51.0	46.0	40.0	32.0			GC WITH SA & CB
982	07-29-91	5607.6	1450	182	100.0	90.0	74.0	70.0	61.0	55.0	50.0	44.0	35.0	27.0	27.0	14.0	GC WITH SA & CB
999	07-31-91	5605.7	1380	180	100.0	***79.0***	55.0	***48.0***	35.0	31.0	28.0	24.0	19.0	15.0			GC WITH CB & SA
1006	08-02-91	5612.5	1400	200	100.0	83.0	64.0	61.0	53.0	49.0	44.0	38.0	31.0	24.0	28.0	10.0	GC WITH SA & CB
1010	08-02-91	5614.5	1450	133	100.0	89.0	73.0	68.0	60.0	55.0	51.0	45.0	37.0	29.0			GC WITH SA & CB
1023	08-06-91	5619.5	1550	140	100.0	89.0	76.0	71.0	63.0	57.0	52.0	45.0	36.0	26.0	25.0	8.0	GC WITH SA & CB
1028	08-06-91	5620.7	1500	110	100.0	86.0	71.0	68.0	60.0	54.0	50.0	43.0	35.0	27.0			GC WITH SA & CB
1038	08-07-91	5621.5	1545	78	100.0	***79.0***	59.0	54.0	47.0	43.0	38.0	32.0	26.0	20.0	25.0	10.0	GC WITH SA & CB
1049	08-08-91	5623.6	1445	150	100.0	85.0	67.0	63.0	55.0	48.0	43.0	37.0	30.0	24.0			GC WITH SA & CB
1060	08-09-91	5627.0	1540	150	100.0	85.0	65.0	61.0	52.0	48.0	43.0	37.0	28.0	22.5	26.0	9.0	GC WITH SA & CB
1067	08-10-91	5617.6	1575	75	100.0	87.0	68.0	65.0	56.0	51.0	46.0	39.0	32.0	24.0			GC WITH SA & CB
1077	08-12-91	5627.4	1400	275	***98.0***	84.0	61.0	57.0	49.0	45.0	40.0	35.0	28.0	21.0			GC WITH SA & CB
1084	08-13-91	5631.2	1440	265	100.0	80.0	60.0	57.0	50.0	46.0	41.0	36.0	29.0	22.0			GC WITH SA & CB
1087	08-14-91	5624.4	1591	286	100.0	92.0	76.0	73.0	66.0	61.0	56.0	51.0	44.0	36.0	34.0	18.0	GC WITH SA
1099	08-16-91	5632.8	1625	95	100.0	93.0	81.0	77.0	68.0	63.0	59.0	54.0	***49.0***	42.0			GC WITH SA
1111	08-17-91	5633.1	1390	175	100.0	91.0	75.0	72.0	65.0	61.0	56.0	50.0	43.0	35.0			GC WITH SA
1120	08-19-91	5632.2	1420	95	100.0	93.0	86.0	83.0	77.0	***72.0***	***67.0***	***61.0***	***54.0***	42.5	32.0	17.0	SC WITH GR
1129	08-21-91	5637.1	1585	223	100.0	88.0	72.0	70.0	60.0	55.0	51.0	46.0	41.0	33.0			GC WITH SA
1140	08-21-91	5641.0	1635	235	100.0	86.0	74.0	70.0	62.0	57.0	52.0	46.0	39.0	30.0	33.0	18.0	GC WITH SA & CB
1150	08-22-91	5639.6	1400	165	100.0	84.0	61.0	58.0	51.0	47.0	44.0	40.0	34.0	28.0			GC WITH SA & CB
1152	08-23-91	5641.1	1675	120	100.0	82.0	69.0	65.0	57.0	51.0	45.0	38.0	31.0	25.0	33.0	17.0	GC WITH SA & CB
1154	08-23-91	5639.6	1600	50	100.0	89.0	77.0	73.0	65.0	60.0	56.0	49.0	40.0	31.0			GC WITH SA & CB
1188	08-24-91	5643.3	1525	250	***99.0***	***76.0***	60.0	57.0	53.0	49.0	45.0	40.0	34.0	22.0	27.0	10.0	GC WITH SA & CB
1235	08-29-91	5644.2	1550	250	100.0	91.0	75.0	71.0	64.0	58.0	54.0	47.0	40.0	32.0			GC WITH SA & CB
1243	08-31-91	5639.0	1330	98	100.0	83.0	67.0	64.0	57.0	53.0	49.0	44.0	38.0	33.0	35.0	21.0	GC WITH SA & CB
1250	08-31-91	5644.3	1370	220	100.0	84.0	64.0	60.0	49.0	44.0	39.0	34.0	28.0	22.0			GC WITH SA & CB
1252	08-31-91	5647.8	1650	350	100.0	***75.0***	***54.0***	51.0	44.0	40.0	37.0	33.0	28.0	23.0	34.0	19.0	GC WITH CB & SA
1256	09-03-91	5646.3	1400	286	100.0	94.0	77.0	71.0	63.0	58.0	53.0	47.0	41.0	34.0			GC WITH SA
1259	09-03-91	5643.9	1550	90	100.0	93.0	75.0	69.0	59.0	52.0	48.0	43.0	38.0	33.0	33.0	19.0	GC WITH SA & CB

TEST NUMBER	DATE	ELEV	LOCATION		GRADATION - PERCENT PASSING										LL	PI	CLASSIFICATION
			STATION	OFFSET	8 IN	3 IN	1 IN	3/4IN	3/8IN	# 4	# 10	# 40	#100	#200			
1262	09-04-91	5648.5	1530	300	100.0	98.0	88.0	85.0	80.0	**75.0**	**71.0**	**66.0**	**60.0**	**51.3**			SA CL WITH GR
1275	09-05-91	5649.6	1530	300	100.0	86.0	75.0	70.0	55.0	47.0	43.0	38.0	33.0	27.0	34.0	18.0	GC WITH SA & CB
1314	09-18-91	5650.3	1400	270	100.0	91.0	72.0	67.0	58.0	52.0	48.0	42.0	36.0	29.0			GC WITH SA & CB
1318	09-19-91	5653.0	1557	264	100.0	87.0	74.0	72.0	64.0	59.0	55.0	50.0	44.0	37.0	30.0	15.0	GC WITH SA & CB
1324	09-20-91	5650.3	1300	180	100.0	85.0	60.0	57.0	50.0	45.0	40.0	36.0	31.0	26.0			GC WITH SA & CB
1330	09-22-91	5656.6	1585	380	100.0	84.0	62.0	58.0	51.0	46.0	43.0	38.0	34.0	28.0	31.0	18.0	GC WITH SA & CB
1334	09-22-91	5652.4	1450	130	100.0	86.0	74.0	72.0	65.0	61.0	56.0	52.0	47.0	40.0			GC WITH SA & CB
1338	09-23-91	5651.3	2000	100	100.0	88.0	73.0	68.0	51.0	42.0	37.0	33.0	28.0	22.5	26.0	11.0	GC WITH SA & CB
1334A	09-24-91	5651.6	1450	130	100.0	92.0	78.0	73.0	60.0	52.0	47.0	42.0	37.0	30.0			GC WITH SA & CB
1350	09-25-91	5653.6	1561	61	100.0	86.0	68.0	64.0	56.0	50.0	46.0	40.0	33.0	26.0	27.0	12.0	GC WITH SA & CB
1350A	09-25-91	5653.6	1561	61	100.0	86.0	68.0	64.0	56.0	50.0	46.0	40.0	33.0	26.0			GC WITH SA & CB
1358	09-26-91	5660.3	1700	330	100.0	93.0	83.0	80.0	73.0	69.0	65.0	**61.0**	**56.0**	**48.0**			GC WITH SA & CB
1358A	09-28-91	5659.1	1695	335	100.0	90.0	76.0	71.0	61.0	50.0	41.0	35.0	30.0	24.5			GC WITH SA & CB
1360A	09-29-91	5658.0	1620	210	100.0	92.0	81.0	77.0	65.0	55.0	46.0	38.0	32.0	26.0			GC WITH SA & CB
1368	09-30-91	5658.1	1600	88	100.0	92.0	78.0	71.0	58.0	50.0	43.0	38.0	33.0	27.0			GC WITH SA & CB
1368A	10-01-91	5657.9	1597	91	100.0	92.0	78.0	71.0	58.0	50.0	43.0	38.0	33.0	27.0			GC WITH SA & CB
1372	10-01-91	5659.4	1512	296	100.0	86.0	58.0	54.0	50.0	46.0	42.0	37.0	33.0	27.5			GC WITH SA & CB
1376	10-01-91	5659.9	1972	117	100.0	91.0	71.0	65.0	54.0	48.0	44.0	39.0	34.0	28.0	30.0	14.0	GC WITH SA & CB
1391	10-03-91	5660.0	1707	184	100.0	92.0	73.0	69.0	60.0	54.0	49.0	45.0	39.0	34.0			GC WITH SA & CB
1396	10-04-91	5660.0	1515	88	100.0	93.0	83.0	80.0	73.0	66.0	61.0	55.0	48.0	39.0	31.0	16.0	SC WITH GR & CB
1401	10-05-91	5660.8	1445	240	100.0	88.0	72.0	67.0	60.0	56.0	53.0	49.0	44.0	37.0			GC WITH SA & CB
1396A	10-05-91	5660.0	1515	95	100.0	91.0	72.0	68.0	58.0	48.0	41.0	35.0	31.0	25.5			GC WITH SA & CB
1407	10-06-91	5662.9	1959	165	100.0	94.0	83.0	80.0	74.0	68.0	63.0	**58.0**	**52.0**	44.0			GC WITH SA & CB
1414	10-07-91	5665.1	1878	300	100.0	91.0	78.0	74.0	66.0	59.0	53.0	47.0	40.0	33.0			GC WITH SA & CB
1419	10-08-91	5663.2	1485	175	100.0	92.0	79.0	74.0	61.0	47.0	36.0	31.0	27.0	22.0			GC WITH SA & CB
1428	10-10-91	5667.1	1615	315	100.0	85.0	64.0	60.0	49.0	42.0	36.0	31.0	26.0	21.0			GC WITH SA & CB
1452	10-11-91	5666.8	1985	292	100.0	88.0	74.0	69.0	59.0	52.0	47.0	41.0	36.0	30.0	30.0	16.0	GC WITH SA & CB
1456	10-11-91	5663.1	1383	173	100.0	93.0	74.0	68.0	54.0	46.0	40.0	35.0	32.0	26.0			GC WITH SA & CB
1462	10-12-91	5664.4	2088	200	100.0	89.0	69.0	66.0	59.0	54.0	50.0	47.0	43.0	37.0	38.0	22.0	GC WITH SA & CB
1464	10-13-91	5664.3	2120	63	**98.0**	88.0	74.0	71.0	62.0	56.0	51.0	44.0	38.0	30.0			GC WITH SA & CB
1467	10-14-91	5668.1	1489	317	100.0	**76.0**	55.0	52.0	45.0	41.0	37.0	32.0	27.0	22.0	31.0	16.0	GC WITH CB & SA
1470	10-16-91	5668.7	2102	275	100.0	90.0	73.0	70.0	60.0	55.0	49.0	42.0	35.0	29.0			GC WITH SA & CB
1472	10-16-91	5669.0	1969	277	100.0	87.0	64.0	61.0	53.0	48.0	43.0	36.0	30.0	24.0	33.0	14.0	GC WITH SA & CB
1483	10-17-91	5668.7	1335	325	100.0	94.0	81.0	77.0	70.0	62.0	56.0	48.0	41.0	34.0			GC WITH SA & CB
1491	10-18-91	5675.4	1700	404	100.0	80.0	57.0	54.0	48.0	43.0	40.0	36.0	31.0	25.0	29.0	16.0	GC WITH CB & SA
1493	10-19-91	5668.5	1431	94	100.0	84.0	68.0	64.0	58.0	53.0	49.0	43.0	37.0	30.0			GC WITH SA & CB
1499	10-21-91	5668.7	1550	224	100.0	84.0	70.0	66.0	58.0	50.0	44.0	37.0	30.0	23.0	31.0	17.0	GC WITH SA & CB
1513	03-16-92	5675.9	1550	362	100.0	90.0	75.0	72.0	65.0	61.0	56.0	50.0	43.0	34.0			GC WITH SA & CB
1552	03-31-92	5675.0	1500	280	100.0	86.0	74.0	72.0	65.0	61.0	56.0	51.0	44.0	36.0	51.0	31.0	SC WITH GR & CB
1565	04-03-92	5672.5	1550	165	**97.5**	84.0	71.0	68.0	61.0	56.0	52.0	46.0	38.0	29.0			GC WITH SA & CB
1567	04-06-92	5674.5	1800	170	**96.5**	85.0	74.0	71.0	65.0	61.0	57.0	51.0	44.0	36.0			SC WITH GR & CB
1565A	04-06-92	5672.1	1560	170	**97.5**	84.0	71.0	68.0	61.0	56.0	52.0	46.0	38.0	29.0			GC WITH SA & CB
1574	04-07-92	5681.7	1550	380	100.0	98.0	79.0	73.0	62.0	54.0	49.0	44.0	40.0	33.0			GC WITH SA & CB
1567A	04-08-92	5674.5	1800	170	100.0	89.0	81.0	77.0	71.0	66.0	61.0	54.0	47.0	38.0			SC WITH GR & CB
1585	04-09-92	5673.4	2050	180	**98.0**	82.0	69.0	66.0	60.0	56.0	52.0	47.0	41.0	34.0	32.0	17.0	GC WITH SA & CB
1602	04-10-92	5674.0	1925	105	100.0	91.0	71.0	67.0	60.0	54.0	50.0	43.0	37.0	30.0			GC WITH SA & CB
1609	04-14-92	5677.9	1950	244	100.0	90.0	71.0	66.0	57.0	52.0	48.0	43.0	37.0	30.0			GC WITH SA & CB
1618	04-25-92	5678.4	1950	244	100.0	94.0	81.0	78.0	71.0	64.0	59.0	53.0	46.0	39.0			GC WITH SA & CB
1629	04-25-92	5677.3	1950	138	**97.0**	**77.0**	**53.0**	49.0	42.0	37.0	33.0	27.0	22.0	16.5			GC WITH CB & SA
1643	04-27-92	5677.2	1570	249	100.0	80.0	58.0	52.0	43.0	37.0	33.0	26.0	21.0	15.0			GC WITH SA & CB
1644	04-26-92	5681.0	1381	401	100.0	90.0	72.0	67.0	58.0	51.0	46.0	40.0	33.0	26.0	27.0	13.0	GC WITH SA & CB
1656	04-28-92	5676.5	1303	181	100.0	92.0	78.0	74.0	65.0	58.0	53.0	46.0	38.0	31.0			GC WITH SA & CB

QUALITY ACCEPTANCE TESTING - GRADATIONS REPORT REPORT NUMBER: RII.1

TEST NUMBER	DATE	ELEV	LOCATION		GRADATION - PERCENT PASSING										LL	PI	CLASSIFICATION
			STATION	OFFSET	8 IN	3 IN	1 IN	3/4IN	3/8IN	# 4	# 10	# 40	#100	#200			
1662	04-29-92	5677.5	2252	161	100.0	88.0	66.0	61.0	51.0	47.0	42.0	35.0	28.0	22.0			GC WITH SA & CB
1671	04-30-92	5676.6	2101	291	100.0	85.0	58.0	54.0	45.0	40.0	36.0	31.0	24.0	19.0			GC WITH SA & CB
1677	05-02-92	5679.8	1660	223	100.0	80.0	64.0	59.0	52.0	47.0	42.0	36.0	30.0	24.0	27.0	11.0	GC WITH SA & CB
1679	05-02-92	5682.0	1550	260	100.0	84.0	67.0	63.0	56.0	51.0	46.0	41.0	34.0	26.0			GC WITH SA & CB
1681	05-02-92	5685.6	1348	367	100.0	87.0	66.0	62.0	53.0	48.0	43.0	38.0	32.0	24.0			GC WITH SA & CB
1685	05-02-92	5683.0	2075	265	100.0	86.0	66.0	59.0	46.0	38.0	32.0	28.0	24.0	18.0			GC WITH SA & CB
1689	05-04-92	5684.5	1975	270	100.0	80.0	64.0	61.0	54.0	50.0	46.0	41.0	35.0	28.0	28.0	13.0	GC WITH SA & CB
1691	05-05-92	5681.0	1775	195	***97.0***	81.0	63.0	59.0	54.0	50.0	46.0	34.0	34.0	26.0			GC WITH SA & CB
1697	05-06-92	5682.7	1839	126	***97.0***	85.0	67.0	63.0	56.0	52.0	48.0	42.0	35.0	27.0			GC WITH SA & CB
1698	05-06-92	5680.0	1606	78	***98.0***	84.0	61.0	55.0	46.0	42.0	37.0	32.0	26.0	20.0			GC WITH SA & CB
1704	05-10-92	5684.7	2050	205	100.0	90.0	71.0	68.0	60.0	54.0	48.0	41.0	33.0	26.0			GC WITH SA & CB
1713	05-14-92	5681.8	1450	140	100.0	93.0	75.0	68.0	58.0	52.0	48.0	43.0	36.0	27.0	35.0	20.0	GC WITH SA & CB
1714	05-12-92	5686.7	1450	350	100.0	85.0	74.0	71.0	65.0	60.0	56.0	51.0	44.0	36.0			GC WITH SA & CB
1714A	05-13-92	5686.7	1500	315	100.0	90.0	80.0	76.0	67.0	62.0	57.0	52.0	44.0	35.0			SC WITH GR & CB
1719	05-14-92	5685.4	2270	75	100.0	81.0	68.0	64.0	56.0	50.0	43.0	36.0	29.0	22.0			GC WITH SA & CB
1722	05-15-92	5682.4	1300	121	***98.0***	80.0	63.0	59.0	52.0	46.0	42.0	36.0	30.0	23.0			GC WITH SA & CB
1719A	05-15-92	5685.1	2270	75	100.0	81.0	68.0	64.0	56.0	50.0	43.0	36.0	29.0	22.0			GC WITH SA & CB
1733	05-17-92	5687.8	1909	184	100.0	95.0	66.0	61.0	47.0	41.0	35.0	27.0	20.0	15.0			GC WITH SA & CB
1735	05-18-92	5687.1	1300	280	***98.0***	84.0	72.0	70.0	63.0	58.0	54.0	48.0	41.0	33.0	33.0	18.0	GC WITH SA & CB
1739	05-19-92	5687.3	1800	63	100.0	88.0	74.0	69.0	62.0	57.0	53.0	48.0	41.0	35.0			GC WITH SA & CB
1740	05-20-92	5688.2	2100	196	100.0	95.0	80.0	77.0	71.0	65.0	61.0	55.0	48.0	39.0			GC WITH SA & CB
1743	05-26-92	5687.2	1600	180	***98.0***	86.0	69.0	65.0	58.0	53.0	48.0	43.0	38.0	31.0			GC WITH SA & CB
1748	05-27-92	5686.9	1550	75	100.0	92.0	78.0	75.0	69.0	64.0	59.0	54.0	47.0	37.0			GC WITH SA & CB
1749	05-27-92	5687.6	1700	190	100.0	86.0	65.0	62.0	56.0	50.0	45.0	38.0	31.0	25.0	33.0	12.0	GC WITH SA & CB
1758	05-28-92	5687.3	1400	185	***97.0***	82.0	69.0	66.0	59.0	54.0	50.0	43.0	36.0	28.0			GC WITH SA & CB
1763	05-29-92	5692.8	1650	340	***93.0***	***73.0***	61.0	58.0	51.0	47.0	43.0	38.0	32.0	25.0			GC WITH SA & CB
1765	05-29-92	5689.7	1750	140	100.0	84.0	71.0	68.0	60.0	55.0	50.0	44.0	38.0	30.0			GC WITH SA & CB
1769	05-30-92	5689.7	1700	50	100.0	96.0	74.0	69.0	59.0	53.0	48.0	40.0	32.0	24.0			GC WITH SA & CB
1771	05-30-92	5691.2	1825	212	***98.0***	86.0	69.0	65.0	57.0	51.0	45.0	38.0	31.0	22.0	27.0	8.0	GC WITH SA & CB
1763A	05-29-92	5692.1	1650	340	***93.0***	***73.0***	61.0	58.0	51.0	47.0	43.0	38.0	32.0	25.0			GC WITH SA & CB
1775	06-01-92	5690.4	2050	55	100.0	84.0	68.0	65.0	58.0	52.0	48.0	42.0	36.0	29.0			GC WITH SA & CB
1777	06-01-92	5690.7	2306	340	100.0	***79.0***	60.0	56.0	48.0	44.0	40.0	35.0	29.0	23.0			GC WITH SA & CB
1771A	05-31-92	5691.3	1825	212	***98.0***	86.0	69.0	65.0	57.0	51.0	45.0	38.0	31.0	22.0	27.0	8.0	GC WITH SA & CB
1781	06-01-92	5690.1	1620	95	100.0	91.0	77.0	72.0	63.0	57.0	51.0	44.0	35.0	27.0			GC WITH SA & CB
1785	06-01-92	5692.4	1550	340	100.0	89.0	76.0	71.0	63.0	58.0	53.0	46.0	39.0	31.0			GC WITH SA & CB
1789	06-03-92	5692.1	2150	200	100.0	86.0	61.0	56.0	47.0	41.0	36.0	30.0	24.0	18.0	27.0	8.0	GC WITH SA & CB
1790	06-03-92	5690.4	1550	110	***96.0***	85.0	68.0	63.0	54.0	49.0	45.0	38.0	32.0	24.0			GC WITH SA & CB
1795	06-04-92	5692.0	2190	240	***96.0***	82.0	65.0	61.0	54.0	49.0	45.0	38.0	30.0	23.0			GC WITH SA & CB
1800	06-05-92	5691.1	1382	90	***96.0***	84.0	56.0	51.0	43.0	40.0	37.0	34.0	29.0	24.0			GC WITH SA & CB
1802	06-05-92	5693.7	2200	120	100.0	87.0	67.0	62.0	53.0	48.0	44.0	40.0	36.0	29.0			GC WITH CB & SA
1808	06-06-92	5693.3	2327	67	100.0	92.0	75.0	71.0	62.0	57.0	53.0	47.0	41.0	33.0	29.0	15.0	GC WITH SA & CB
1812	06-08-92	5694.0	1240	31	100.0	87.0	68.0	64.0	56.0	52.0	47.0	42.0	35.0	27.0			GC WITH SA & CB
1813	06-08-92	5695.3	2175	135	100.0	84.0	71.0	68.0	62.0	56.0	51.0	44.0	36.0	28.0			SC WITH GR & CB
1816	06-08-92	5696.3	2352	240	100.0	84.0	73.0	68.0	61.0	56.0	52.0	47.0	40.0	32.0			GC WITH SA & CB
1823	06-10-92	5696.3	1450	300	***93.0***	80.0	57.0	53.0	46.0	42.0	39.0	35.0	30.0	25.0			GC WITH SA & CB
1824	06-10-92	5694.4	1450	50	***98.0***	***71.0***	***54.0***	50.0	44.0	40.0	36.0	31.0	26.0	20.0			GC WITH CB & SA
1835	06-10-92	5696.3	2020	265	100.0	92.0	75.0	71.0	63.0	59.0	55.0	50.0	43.0	36.0			GC WITH SA & CB
1841	06-11-92	5698.9	1800	323	100.0	91.0	72.0	67.0	58.0	52.0	47.0	40.0	33.0	26.0			GC WITH SA & CB
1842	06-12-92	5697.7	1800	100	***97.0***	80.0	64.0	59.0	51.0	46.0	42.0	36.0	30.0	23.0	29.0	14.0	GC WITH SA & CB
1844	06-13-92	5698.8	1700	240	***98.0***	92.0	75.0	72.0	63.0	58.0	53.0	47.0	39.0	32.0	31.0	14.0	GC WITH SA & CB
1849	06-13-92	5696.7	1450	75	100.0	82.0	66.0	62.0	54.0	49.0	45.0	40.0	32.0	25.0			GC WITH SA & CB
1851	06-18-92	5696.4	1500	150	100.0	92.0	80.0	77.0	69.0	62.0	57.0	50.0	40.0	31.0			SC WITH GR & CB

TEST NUMBER	DATE	ELEV	LOCATION		GRADATION - PERCENT PASSING										LL	PI	CLASSIFICATION
			STATION	OFFSET	8 IN	3 IN	1 IN	3/4IN	3/8IN	# 4	# 10	# 40	#100	#200			
1849A	06-18-92	5696.7	1450	75	100.0	89.0	78.0	69.0	60.0	55.0	50.0	44.0	37.0	29.0			GC WITH SA & CB
1853	06-18-92	5696.4	1300	282	***98.0***	95.0	81.0	76.0	68.0	62.0	57.0	50.0	42.0	33.0			GC WITH SA & CB
1853A	06-19-92	5699.0	1300	282	***98.0***	95.0	81.0	76.0	68.0	62.0	57.0	50.0	42.0	33.0			GC WITH SA & CB
1861	06-20-92	5700.4	2050	290	100.0	86.0	67.0	63.0	56.0	51.0	47.0	41.0	35.0	27.0	31.0	16.0	GC WITH SA & CB
1865	06-21-92	5699.4	1500	260	100.0	93.0	81.0	77.0	69.0	63.0	59.0	52.0	45.0	36.0			GC WITH SA & CB
1868	06-22-92	5700.6	1900	240	***99.0***	***78.0***	62.0	59.0	52.0	46.0	42.0	36.0	28.0	22.0			GC WITH SA & CB
1870	06-22-92	5699.7	1352	120	100.0	94.0	73.0	68.0	59.0	53.0	48.0	44.0	39.0	34.0	48.0	30.0	GC WITH SA & CB
1878	06-23-92	5701.4	1430	277	***97.0***	86.0	70.0	67.0	60.0	55.0	50.0	44.0	37.0	29.0			GC WITH SA & CB
1880	06-24-92	5702.1	1487	177	100.0	88.0	71.0	66.0	59.0	54.0	50.0	45.0	41.0	36.0			GC WITH SA & CB
1886	06-25-92	5703.6	2050	146	100.0	84.0	67.0	64.0	58.0	52.0	48.0	42.0	35.0	29.0			GC WITH SA & CB
1890	06-25-92	5705.1	1865	225	***96.0***	***69.0***	***54.0***	52.0	47.0	43.0	39.0	34.0	29.0	23.0	31.0	12.0	GC WITH CB & SA
1895	06-25-92	5702.2	1262	60	***97.0***	89.0	73.0	68.0	60.0	55.0	52.0	47.0	43.0	38.0			GC WITH SA & CB
1897	06-26-92	5705.0	2250	205	100.0	87.0	73.0	69.0	61.0	57.0	52.0	47.0	40.0	31.0			GC WITH SA & CB
1898	06-26-92	5705.7	1800	70	100.0	94.0	77.0	74.0	64.0	58.0	53.0	48.0	43.0	38.0			GC WITH SA & CB
1900	06-27-92	5706.6	1625	75	100.0	87.0	73.0	67.0	58.0	52.0	47.0	41.0	37.0	32.0			GC WITH SA & CB
1901	06-27-92	5706.1	1900	280	100.0	88.0	75.0	72.0	64.0	59.0	54.0	48.0	41.0	32.0	31.0	18.0	GC WITH SA & CB
1908	06-28-92	5708.3	2050	76	100.0	94.0	80.0	76.0	68.0	65.0	61.0	***56.0***	***52.0***	***47.0***			GC WITH SA & CB
1910	06-28-92	5705.0	2305	315	***91.0***	***79.0***	66.0	62.0	55.0	51.0	46.0	40.0	34.0	26.0			GC WITH SA & CB
1917	06-29-92	5705.1	1255	230	100.0	***78.0***	62.0	58.0	51.0	46.0	42.0	36.0	29.0	22.0			GC WITH SA & CB
1920	06-29-92	5707.8	2205	70	100.0	89.0	69.0	64.0	57.0	53.0	49.0	45.0	41.0	36.0	43.0	27.0	GC WITH SA & CB
1923	07-02-92	5707.7	1200	290	***95.0***	87.0	75.0	71.0	65.0	60.0	56.0	50.0	43.0	35.0			GC WITH SA & CB
1933	07-03-92	5711.2	1561	55	100.0	92.0	72.0	67.0	59.0	55.0	52.0	47.0	43.0	38.0			GC WITH SA & CB
1935	07-03-92	5707.9	1400	267	100.0	***69.0***	***51.0***	***48.0***	42.0	39.0	35.0	31.0	26.0	20.0			GC WITH CB & SA
1940	07-06-92	5712.2	1680	280	100.0	86.0	65.0	61.0	53.0	49.0	45.0	39.0	32.0	24.0	31.0	18.0	GC WITH SA & CB
1941	07-06-92	5710.1	2300	95	***98.0***	93.0	70.0	64.0	51.0	45.0	40.0	35.0	31.0	25.0			GC WITH SA & CB
1942	07-06-92	5707.5	1244	167	100.0	90.0	75.0	72.0	65.0	61.0	57.0	51.0	43.0	33.0			GC WITH SA & CB
1946A	07-07-92	5710.7	1300	280	100.0	88.0	64.0	60.0	50.0	46.0	42.0	37.0	31.0	25.0			GC WITH SA & CB
1953	07-08-92	5710.7	1550	215	***92.0***	***70.0***	57.0	53.0	48.0	44.0	41.0	37.0	32.0	25.0	29.0	13.0	GC WITH CB & SA
1956	07-08-92	5711.2	2246	57	100.0	86.0	70.0	64.0	56.0	52.0	48.0	43.0	38.0	31.0			GC WITH SA & CB
1960	07-09-92	5712.7	2171	256	100.0	84.0	68.0	64.0	57.0	52.0	46.0	38.0	30.0	21.0			GC WITH SA & CB
1964	07-09-92	5716.1	1500	70	100.0	92.0	75.0	71.0	64.0	60.0	56.0	51.0	46.0	35.0			GC WITH SA & CB
1967	07-10-92	5717.7	1915	80	100.0	92.0	75.0	71.0	61.0	55.0	50.0	45.0	39.0	29.0			GC WITH SA & CB
1969	07-10-92	5709.7	2375	240	***96.0***	***78.0***	56.0	51.0	43.0	38.0	35.0	30.0	25.0	18.0	25.0	7.0	GC-GM W SA & CB
1972	07-11-92	5717.2	1760	135	100.0	92.0	76.0	73.0	65.0	59.0	55.0	48.0	41.0	32.0			GC WITH SA & CB
1973	07-14-92	5716.7	1850	260	***97.0***	84.0	66.0	62.0	54.0	48.0	43.0	37.0	31.0	23.0			GC WITH SA & CB
1977	07-15-92	5717.6	1630	50	100.0	***79.0***	65.0	61.0	52.0	48.0	43.0	38.0	32.0	24.0			GC WITH SA & CB
1979	07-15-92	5717.3	2125	280	100.0	95.0	70.0	62.0	50.0	45.0	39.0	31.0	25.0	18.0			GC WITH SA & CB
1981	07-16-92	5719.4	1800	200	100.0	96.0	83.0	79.0	70.0	64.0	60.0	53.0	44.0	35.0	24.0	6.0	GC-GM W SA & CB
1984	07-17-92	5717.6	1920	115	100.0	96.0	82.0	77.0	69.0	64.0	60.0	52.0	44.0	33.0			GC WITH SA & CB
1986	07-16-92	5716.9	2242	276	100.0	96.0	79.0	73.0	62.0	55.0	50.0	43.0	34.0	24.0			GC WITH SA & CB
1990	07-17-92	5723.0	1880	130	100.0	87.0	75.0	72.0	65.0	60.0	56.0	50.0	43.0	34.0			GC WITH SA & CB
1996	07-18-92	5716.6	2463	64	100.0	92.0	76.0	72.0	64.0	58.0	54.0	46.0	36.0	26.0			GC WITH SA & CB
1998	07-18-92	5717.8	1240	180	100.0	93.0	77.0	71.0	61.0	57.0	53.0	48.0	39.0	27.0			GC WITH SA & CB
2004	07-18-92	5720.5	2090	54	100.0	89.0	72.0	69.0	61.0	55.0	50.0	43.0	35.0	26.0			GC WITH SA & CB
2007	07-19-92	5722.7	1752	190	100.0	91.0	75.0	72.0	64.0	58.0	54.0	48.0	39.0	28.0			GC WITH SA & CB
2009	07-20-92	5722.3	2282	182	100.0	91.0	66.0	61.0	53.0	48.0	43.0	38.0	30.0	22.0			GC WITH SA & CB
2015	07-21-92	5725.3	1850	43	***98.0***	91.0	68.0	61.0	52.0	46.0	41.0	35.0	29.0	21.0			GC WITH SA & CB
2019	07-21-92	5719.5	2239	45	100.0	93.0	73.0	64.0	56.0	51.0	47.0	41.0	33.0	24.0			GC WITH SA & CB
2022	07-22-92	5722.7	1300	104	100.0	92.0	68.0	62.0	53.0	46.0	42.0	36.0	29.0	21.0			GC WITH SA & CB
2026	07-22-92	5725.0	1748	132	100.0	92.0	75.0	69.0	60.0	53.0	48.0	42.0	34.0	25.0			GC WITH SA & CB
2029	07-22-92	5722.2	2336	111	100.0	92.0	75.0	71.0	65.0	61.0	57.0	52.0	44.0	34.0	31.0	15.0	GC WITH SA & CB
2030	07-23-92	5727.4	1681	217	100.0	94.0	80.0	76.0	70.0	66.0	63.0	***57.0***	***49.0***	38.0			SC WITH GR & CB

QUALITY ACCEPTANCE TESTING - GRADATIONS REPORT REPORT NUMBER: RII.1

TEST NUMBER	DATE	ELEV	LOCATION STATION	LOCATION OFFSET	GRADATION - PERCENT PASSING 8 IN	3 IN	1 IN	3/4IN	3/8IN	# 4	# 10	# 40	#100	#200	LL	PI	CLASSIFICATION
2031	07-23-92	5723.4	1184	135	***89.0***	80.0	67.0	64.0	57.0	53.0	49.0	44.0	37.0	29.0			GC WITH SA & CB
2034	07-23-92	5724.4	1300	70	100.0	89.0	70.0	66.0	59.0	53.0	48.0	41.0	33.0	23.0			GC WITH SA & CB
2039	07-24-92	5728.2	2008	70	***97.0***	88.0	76.0	73.0	67.0	61.0	57.0	51.0	43.0	34.0	31.0	16.0	SC WITH GR & CB
2041	07-27-92	5726.8	2150	70	100.0	86.0	71.0	67.0	60.0	55.0	51.0	45.0	36.0	27.0			GC WITH SA & CB
2053	07-28-92	5728.5	1550	105	100.0	81.0	65.0	62.0	55.0	51.0	46.0	41.0	33.0	25.0			GC WITH SA & CB
2062	07-29-92	5730.6	2050	196	100.0	84.0	68.0	65.0	58.0	52.0	50.0	40.0	32.0	24.0			GC WITH SA & CB
2076	07-30-92	5731.0	1426	52	100.0	91.0	68.0	63.0	54.0	49.0	44.0	39.0	32.0	24.0	36.0	21.0	GC WITH SA & CB
2078	07-31-92	5730.6	1462	220	***94.0***	82.0	72.0	69.0	62.0	56.0	51.0	45.0	36.0	27.0			SC WITH GR & CB
2083	07-31-92	5729.5	2350	65	***97.0***	83.0	69.0	65.0	58.0	54.0	50.0	44.0	35.0	26.0			GC WITH SA & CB
2085	08-01-92	5731.6	1300	48	100.0	83.0	70.0	67.0	61.0	56.0	51.0	45.0	37.0	23.0			SC WITH GR & CB
2089	08-02-92	5731.8	1300	150	***93.0***	85.0	70.0	67.0	59.0	55.0	51.0	44.0	37.0	28.0	28.0	14.0	GC WITH SA & CB
2092	08-02-92	5735.9	2050	60	100.0	93.0	76.0	72.0	63.0	58.0	54.0	47.0	38.0	28.0			GC WITH SA & CB
2104	08-04-92	5733.3	1300	194	100.0	92.0	77.0	73.0	64.0	59.0	53.0	47.0	39.0	30.0			GC WITH SA & CB
2109	08-04-92	5734.2	2350	70	100.0	88.0	72.0	68.0	61.0	56.0	52.0	46.0	39.0	30.0			GC WITH SA & CB
2111	08-05-92	5734.7	1375	204	100.0	84.0	65.0	62.0	55.0	48.0	43.0	35.0	27.0	19.0	24.0	5.0	GC-GM W SA & CB
2117	08-05-92	5734.7	1200	40	100.0	84.0	70.0	67.0	61.0	57.0	54.0	49.0	41.0	31.0			GC WITH SA & CB
2121	08-06-92	5735.0	2350	157	100.0	92.0	77.0	74.0	67.0	63.0	61.0	***56.0***	48.0	37.0			GC WITH SA & CB
2122	08-06-92	5739.3	1700	50	***95.0***	***74.0***	59.0	55.0	48.0	43.0	38.0	33.0	27.0	21.0	29.0	17.0	GC WITH CB & SA
2123	08-07-92	5735.0	1243	201	***93.0***	83.0	66.0	63.0	55.0	50.0	46.0	40.0	32.0	23.0			GC WITH SA & CB
2126	08-07-92	5735.2	2500	69	100.0	97.0	80.0	77.0	68.0	62.0	58.0	52.0	42.0	32.0			GC WITH SA & CB
2128	08-08-92	5740.8	1625	105	100.0	96.0	81.0	77.0	66.0	58.0	52.0	45.0	31.0	21.0			GC WITH SA & CB
2129	08-10-92	5739.4	1719	176	100.0	89.0	76.0	72.0	64.0	58.0	52.0	45.0	37.0	27.0			SC WITH GR & CB
2133	08-11-92	5736.7	1174	150	***92.0***	***76.0***	62.0	58.0	51.0	46.0	42.0	36.0	30.0	22.0			GC WITH CB & SA
2138	08-11-92	5739.0	1360	200	100.0	92.0	76.0	72.0	65.0	60.0	56.0	49.0	40.0	30.0			GC WITH SA & CB
2139	08-11-92	5736.1	2548	73	***95.0***	***77.0***	63.0	60.0	53.0	47.0	43.0	38.0	31.0	23.0			GC WITH SA & CB
2142	08-12-92	5740.4	1157	77	100.0	***75.0***	57.0	53.0	46.0	41.0	38.0	34.0	28.0	21.0			GC WITH CB & SA
2147	08-13-92	5740.5	1409	181	100.0	89.0	66.0	61.0	53.0	48.0	43.0	37.0	31.0	22.0	25.0	8.0	GC WITH SA & CB
2148	08-13-92	5740.6	2400	80	100.0	89.0	76.0	69.0	61.0	54.0	48.0	42.0	30.0	21.0			GC WITH SA & CB
2162	08-13-92	5741.4	2150	185	100.0	91.0	68.0	63.0	55.0	50.0	46.0	41.0	34.0	25.0			GC WITH SA & CB
2165	08-14-92	5742.0	1500	80	100.0	86.0	65.0	60.0	52.0	45.0	40.0	35.0	24.0	17.0			GM WITH SA & CB
2174	08-14-92	5742.4	1400	120	100.0	87.0	73.0	67.0	58.0	52.0	48.0	43.0	31.0	22.0			GC WITH SA & CB
2177	08-14-92	5742.3	2150	177	***92.0***	***74.0***	64.0	60.0	53.0	48.0	45.0	41.0	32.0	24.0			GC WITH CB & SA
2179	08-15-92	5743.3	2245	91	***97.0***	82.0	72.0	69.0	61.0	55.0	49.0	40.0	30.0	22.0	26.0	11.0	SC WITH GR & CB
2184	08-15-92	5740.4	2400	196	100.0	95.0	85.0	81.0	77.0	***72.0***	***68.0***	***61.0***	***53.0***	43.0			SC WITH GR & CB
2185	08-16-92	5743.2	2448	110	100.0	84.0	60.0	55.0	46.0	40.0	35.0	29.0	23.0	17.0			GC WITH SA & CB
2190	08-18-92	5747.2	1600	42	***94.0***	***79.0***	62.0	58.0	52.0	48.0	45.0	40.0	33.0	26.0			GC WITH SA & CB
2187	08-17-92	5745.4	2040	190	100.0	87.0	74.0	71.0	65.0	61.0	58.0	52.0	46.0	38.0	28.0	16.0	GC WITH SA & CB
2198	08-19-92	5748.9	1815	60	***97.0***	92.0	80.0	77.0	70.0	64.0	59.0	55.0	***52.0***	44.0			GC WITH SA & CB
2201	08-20-92	5747.4	1398	90	100.0	85.0	68.0	65.0	58.0	52.0	48.0	42.0	35.0	26.7	40.0	25.0	GC WITH SA & CB
2207	08-21-92	5747.7	2403	72	100.0	83.0	67.0	63.0	56.0	51.0	46.0	43.0	40.0	33.0			GC WITH SA & CB
2208	08-21-92	5748.6	1230	140	***98.0***	***77.0***	59.0	56.0	50.0	46.0	42.0	37.0	31.0	24.1	30.0	15.0	GC WITH SA & CB
2211	08-22-92	5750.9	2050	49	100.0	87.0	73.0	69.0	61.0	54.0	48.0	41.0	33.0	25.1			GC WITH SA & CB
2214	08-22-92	5749.9	2319	37	***98.0***	89.0	75.0	71.0	63.0	58.0	54.0	48.0	41.0	31.7			GC WITH SA & CB
2216	08-23-92	5752.5	1770	87	100.0	90.0	79.0	75.0	68.0	64.0	60.0	54.0	46.0	35.9	31.0	16.0	SC WITH GR & CB
2217	08-23-92	5750.5	1285	35	***97.0***	90.0	74.0	71.0	63.0	58.0	54.0	47.0	38.0	28.5			GC WITH SA & CB
2220	08-24-92	5753.1	1550	61	100.0	86.0	75.0	70.0	61.0	56.0	50.0	43.0	34.0	24.8			SC WITH GR & CB
2221	08-24-92	5754.6	1729	139	100.0	91.0	69.0	63.0	51.0	46.0	41.0	35.0	28.0	21.0	25.0	9.0	GC WITH SA & CB
2225	08-25-92	5751.3	1350	150	100.0	82.0	65.0	62.0	56.0	52.0	49.0	44.0	37.0	29.0			GC WITH SA & CB
2233	08-26-92	5756.3	1168	62	***97.0***	81.0	69.0	66.0	58.0	52.0	45.0	38.0	29.0	21.0			SC WITH GR & CB
2226A	08-27-92	5754.7	1925	66	100.0	96.0	77.0	72.0	62.0	54.0	48.0	41.0	33.0	25.0			GC WITH SA & CB
2238	08-27-92	5756.7	1550	115	100.0	89.0	73.0	69.0	61.0	56.0	51.0	44.0	35.0	26.0			GC WITH SA & CB
2239	08-27-92	5758.6	1715	54	100.0	83.0	62.0	59.0	50.0	44.0	39.0	33.0	25.0	18.0	23.0	6.0	GC-GM W SA & CB

QUALITY ACCEPTANCE TESTING - GRADATIONS REPORT REPORT NUMBER: RII.1

TEST NUMBER	DATE	ELEV	LOCATION		GRADATION - PERCENT PASSING										LL	PI	CLASSIFICATION
			STATION	OFFSET	8 IN	3 IN	1 IN	3/4IN	3/8IN	# 4	# 10	# 40	#100	#200			
2241	08-28-92	5757.4	1260	50	100.0	82.0	68.0	64.0	55.0	49.0	42.0	34.0	26.0	18.0	27.0	12.0	GC WITH SA & CB
2246	08-28-92	5757.1	1247	147	***94.0***	***68.0***	56.0	54.0	48.0	43.0	39.0	33.0	26.0	20.0			GC WITH CB & SA
2250	08-29-92	5759.6	1603	77	100.0	85.0	71.0	67.0	59.0	53.0	48.0	42.0	33.0	25.0			GC WITH SA & CB
2253	08-29-92	5759.6	1427	72	100.0	86.0	66.0	61.0	54.0	50.0	45.0	39.0	30.0	22.0	25.0	18.0	GC WITH SA & CB
2254	08-30-92	5760.9	1134	72	100.0	94.0	80.0	76.0	67.0	61.0	54.0	47.0	38.0	27.0			SC WITH GR & CB
2260	09-01-92	5763.9	1550	40	100.0	96.0	78.0	74.0	66.0	62.0	57.0	51.0	43.0	33.0	26.0	11.0	GC WITH SA & CB
2263	09-02-92	5760.7	2135	35	100.0	***78.0***	66.0	62.0	55.0	50.0	45.0	39.0	32.0	25.0			GC WITH SA & CB
2268	09-02-92	5759.0	2350	142	***95.0***	***79.0***	64.0	63.0	60.0	54.0	48.0	40.0	30.0	22.0			SC WITH GR & CB
2270	09-02-92	5769.2	1390	47	100.0	80.0	64.0	60.0	53.0	49.0	44.0	39.0	32.0	25.0			GC WITH SA & CB
2271	09-03-92	5765.6	1115	46	***94.0***	***77.0***	61.0	57.0	51.0	46.0	41.0	36.0	29.0	21.0			GC WITH SA & CB
2274	09-03-92	5763.5	2563	56	***98.0***	80.0	63.0	60.0	51.0	47.0	41.0	35.0	28.0	21.0			GC WITH SA & CB
2277	09-08-92	5762.5	2350	127	100.0	87.0	72.0	69.0	60.0	55.0	51.0	45.0	38.0	30.0	30.0	15.0	GC WITH SA & CB
2282	09-09-92	5772.0	1550	95	100.0	91.0	79.0	75.0	64.0	56.0	50.0	44.0	36.0	28.0			GC WITH SA & CB
2299	09-11-92	5772.4	1800	95	100.0	***76.0***	61.0	57.0	52.0	46.0	41.0	34.0	28.0	22.0			GC WITH CB & SA
2309	09-13-92	5775.7	1122	90	100.0	87.0	75.0	71.0	63.0	57.0	52.0	45.0	38.0	28.0	28.0	11.0	GC WITH SA & CB
2312	09-14-92	5779.2	1300	84	100.0	82.0	72.0	69.0	62.0	56.0	52.0	46.0	39.0	31.0			GC WITH SA & CB
2328	09-17-92	5784.8	1292	65	100.0	86.0	68.0	64.0	57.0	52.0	47.0	42.0	36.0	30.0			GC WITH SA & CB
2344	09-20-92	5788.8	1156	46	100.0	94.0	73.0	68.0	61.0	56.0	52.0	47.0	42.0	35.0	39.0	24.0	GC WITH SA & CB
2349	09-21-92	5790.0	1105	44	100.0	85.0	72.0	69.0	63.0	58.0	54.0	48.0	41.0	33.0			GC WITH SA & CB
2356	09-23-92	5793.5	2024	47	***96.0***	87.0	78.0	75.0	68.0	62.0	57.0	50.0	42.0	33.0	30.0	15.0	SC WITH GR & CB
2360	09-24-92	5794.5	1300	43	100.0	82.0	67.0	64.0	57.0	52.0	48.0	42.0	35.0	27.0			GC WITH SA & CB
2369	09-25-92	5795.7	1209	37	100.0	86.0	69.0	64.0	56.0	48.0	43.0	38.0	28.0	22.0	27.0	14.0	GC WITH SA & CB
2374	09-27-92	5801.3	1880	25	100.0	92.0	80.0	75.0	68.0	62.0	58.0	52.0	45.0	36.0			GC WITH SA & CB
2377	09-29-92	5802.5	2388	24	100.0	89.0	79.0	76.0	71.0	67.0	63.0	***58.0***	***51.0***	43.0	37.0	20.0	SC WITH GR & CB
2387	10-02-92	5807.6	1425	21	100.0	89.0	71.0	66.0	59.0	53.0	49.0	43.0	37.0	28.0			GC WITH SA & CB
2393	10-07-92	5812.1	1064	12	100.0	***74.0***	59.0	56.0	47.0	42.0	38.0	34.0	28.0	23.0	32.0	18.0	GC WITH CB & SA
2396	10-09-92	5813.9	1944	3	100.0	***75.0***	61.0	56.0	50.0	44.0	40.0	35.0	28.0	22.0			GC WITH CB & SA
2398	10-10-92	5812.9	2775	6	100.0	***79.0***	68.0	64.0	58.0	53.0	49.0	44.0	38.0	30.0			GC WITH SA & CB

NOTE - Emphasized Numbers indicate percent passing outside of gradation range specified.

COMMENT: THIS REPORT COVERS THE ENTIRE CONSTRUCTION OF THE DAM.

LAB CHIEF: ______________________

SUBMITTED BY: ______________________
PROJECT ENGINEER

PROJECT: LITTLE DELL LAKE, DAM AND APPURTENANCES RIVER: SALT LAKE CITY STREAMS STATE: UTAH TOWN: SALT LAKE CITY	CONTRACT NO. DACW05-89-C-0045 CONTRACTOR: CLEMENT BROTHERS AND J.E. STARNES CO.	DATE OF REPORT: 12-07-92 01-01-90 THRU 12-31-92

EMBANKMENT ZONE	MIN. DESIGNED % COMP	SPEC. W.C. % RANGE	LOOSE LIFT THICK. (IN)	NUMBER OF PASSES	COMPACTION EQUIPMENT
RANDOM II	95	-3 TO 1	12	5	SD150D, SD150F, SP60

TEST NUMBER	DATE	ELEV	LOCATION		FIELD		STANDARD LAB COMPACTION			PERCENT COMPACTION	PERCENT +- OMC	CLASSIFICATION
			STATION	OFFSET	DRY DENS (PCF)	MC %	TEST METH	MX DRY DEN	OMC %			
103	04-20-90	5644.0	2175	207	121.7	10.7	H/TF	118.6	11.8	102.6	-1.1	GC WITH SA
110	05-02-90	5645.0	2150	218	123.9	8.1	5/110	121.1	9.9	102.3	-1.8	SC WITH GR & CB
112	05-03-90	5654.0	2260	320	117.9	13.0	5/112	120.0	10.3	98.2	***2.7***	SC WITH GR & CB
113	05-05-90	5657.0	2256	352	109.6	14.9	H/TF	116.6	12.5	***94.0***	***2.4***	SC WITH GR
115	05-07-90	5658.0	2258	360	114.5	9.8	5/115	116.8	12.4	98.0	-2.6	SC WITH GR
119	05-09-90	5661.0	2250	284	122.2	10.9	H/TF	124.0	11.0	98.5	-0.1	GP-GC W SA & CB
120	05-09-90	5663.0	2304	419	108.0	6.3	5/120	119.6	9.6	***90.3***	***-3.3***	GC WITH SA
127	05-11-90	5666.0	2255	345	120.6	10.7	5/127	121.0	10.2	99.7	0.5	SC-SM WITH GR
129	05-16-90	5665.1	2250	290	113.2	10.8	5/129	117.7	12.3	96.2	-1.5	SC WITH GR
131	05-17-90	5666.5	2235	330	114.0	7.9	H/132	123.4	9.2	***92.4***	-1.3	GC WITH SA & CB
132	05-17-90	5668.5	2400	498	112.1	14.9	5/132	123.4	9.2	***90.8***	***5.7***	GC WITH SA & CB
133	05-18-90	5668.5	2247	355	118.5	8.8	5/133	122.4	9.2	96.8	-0.4	GC WITH SA & CB
134	05-19-90	5669.0	2350	386	121.2	10.9	H/133	122.4	9.2	99.0	***1.7***	GC WITH SA & CB
135	05-22-90	5596.5	1351	578	126.3	7.4	H/133	122.4	9.2	103.2	-1.8	GC-GM WITH SA
138	05-24-90	5601.0	1331	630	126.4	7.1	5/138	120.0	10.9	105.3	***-3.8***	GC WITH SA & CB
142	05-25-90	5597.4	1331	475	114.4	12.2	H/138	120.0	10.9	95.3	***1.3***	GC WITH SA & CB
146	05-28-90	5602.6	1332	711	121.3	8.9	5/146	119.9	11.3	101.2	-2.4	GC WITH SA & CB
142A	05-26-90	5597.4	1331	475	113.8	8.9	H/138	120.0	10.9	***94.8***	-2.0	GC WITH SA & CB
150	05-29-90	5602.5	1389	668	126.6	10.7	H/146	119.9	11.4	105.6	-0.7	GC WITH SA & CB
151	05-29-90	5602.5	1375	679	126.5	8.0	H/138	120.0	10.9	105.4	-2.9	GC WITH SA & CB
153	06-04-90	5598.0	1350	476	117.4	8.4	5/153	123.4	9.1	95.1	-0.7	SC WITH GR & CB
154	06-04-90	5600.5	1240	500	118.9	10.0	H/153	123.4	9.1	96.4	0.9	GC WITH SA & CB
159	06-06-90	5604.0	1353	585	118.8	6.1	5/159	118.5	11.1	100.3	***-5.0***	GC WITH SA
160	06-06-90	5605.2	1207	586	113.1	14.0	H/146	119.5	11.3	***94.6***	***2.7***	GC WITH SA
161	06-07-90	5603.5	1309	602	125.5	8.6	5/161	127.5	8.7	98.4	-0.1	GC-GM W SA & CB
162	06-07-90	5603.7	1351	641	125.3	7.2	H/161	127.5	8.7	98.3	-1.5	GC-GM W SA & CB
163	06-08-90	5598.3	1937	583	122.9	6.8	H/161	127.5	8.7	96.4	-1.9	GC WITH SA & CB
164	06-08-90	5605.0	1264	506	123.0	7.4	H/161	127.5	8.7	96.5	-1.3	GC WITH SA & CB
170	06-12-90	5597.1	1418	364	124.2	9.3	H/173	126.2	8.7	98.4	0.6	GC WITH SA & CB
174	06-12-90	5595.5	1373	390	123.7	9.3	H/173	126.2	8.7	98.0	0.6	GC WITH SA & CB
177	06-13-90	5597.0	1339	292	125.8	9.7	H/179	126.0	9.6	99.8	0.1	GC WITH CB & SA
178	06-13-90	5597.7	1417	381	119.5	8.0	H/179	126.0	9.6	***94.8***	-1.6	GW-GC W SA & CB
180	06-14-90	5610.0	1257	663	127.2	9.3	5/180	127.8	8.2	99.5	***1.1***	GW-GM W SA & CB
181	06-14-90	5605.4	1271	437	129.3	9.0	5/180	127.8	8.2	101.2	0.8	GP-GC W SA & CB
188	06-18-90	5599.3	1324	398	119.0	9.4	H/173	126.2	8.7	***94.3***	0.7	GC WITH SA & CB
196	06-20-90	5608.2	1355	605	125.0	7.5	H/183	125.4	8.9	99.7	-1.4	SC WITH GR & CB
197	06-20-90	5608.4	1248	534	122.0	7.2	H/183	125.4	8.9	97.3	-1.7	GC WITH SA & CB
198	06-20-90	5603.1	1302	400	129.9	8.5	H/183	125.4	8.9	103.6	-0.4	GC WITH SA & CB
199	06-21-90	5614.4	1223	650	117.9	7.9	H/201	126.3	8.4	***93.3***	-0.5	GC WITH SA & CB
200	06-21-90	5612.3	1188	462	121.5	5.0	H/201	126.3	8.4	96.2	***-3.4***	GC WITH SA
201	06-21-90	5608.0	1310	528	122.5	4.0	5/201	126.3	8.4	97.0	***-4.4***	GC-GM W SA & CB
206	06-22-90	5613.0	1278	678	121.8	8.1	5/206	123.8	8.3	98.4	-0.2	GC WITH SA & CB
212	06-25-90	5607.0	1305	417	121.4	8.1	H/183	125.4	8.9	96.8	-0.8	GC WITH SA & CB

QUALITY ACCEPTANCE TESTING - COMPACTION REPORT REPORT NUMBER: RII.2

TEST NUMBER	DATE	ELEV	LOCATION		FIELD		STANDARD LAB COMPACTION			PERCENT COMPACTION	PERCENT +- OMC	CLASSIFICATION
			STATION	OFFSET	DRY DENS (PCF)	MC %	TEST METH	MX DRY DEN	OMC %			
214	06-25-90	5608.0	1370	574	124.9	9.6	S/214	124.0	8.7	100.7	0.9	GC-GM W SA & CB
215	06-25-90	5610.0	1279	652	120.8	7.8	H/183	125.4	8.9	96.3	-1.1	GC WITH SA & CB
218	06-26-90	5604.0	1414	307	120.3	7.2	H/219	125.0	8.5	96.2	-1.3	GC WITH SA & CB
219	06-26-90	5610.0	1250	636	125.9	6.4	S/219	125.0	8.5	100.7	-2.1	GC-GM W SA & CB
220	06-26-90	5609.5	1375	655	124.3	8.3	H/202	127.4	8.5	97.6	-0.2	GC WITH CB & SA
221	06-27-90	5603.3	1375	300	123.2	12.3	H/159	118.5	11.1	104.0	***1.2***	GC WITH SA & CB
222	06-27-90	5608.2	1362	450	124.3	8.3	S/222	125.0	8.0	99.4	0.3	GC WITH SA & CB
223	06-27-90	5603.5	1425	270	119.6	7.0	H/222	125.0	8.0	95.7	-1.0	GC WITH SA & CB
224	06-27-90	5607.2	1360	364	133.3	8.4	H/222	125.0	8.0	106.6	0.4	GC WITH SA & CB
225	06-28-90	5609.2	1310	522	119.1	8.4	S/225	120.6	8.8	98.8	-0.4	GC WITH SA & CB
226	06-28-90	5608.6	1389	465	122.1	7.6	H/228	127.8	8.0	95.5	-0.4	GC WITH SA & CB
228	06-28-90	5609.0	1290	415	115.5	9.9	S/228	127.8	8.0	***90.4***	***1.9***	GC WITH SA & CB
229	06-28-90	5615.5	1268	643	124.3	7.7	H/214	124.0	8.7	100.2	-1.0	GC WITH SA & CB
230	06-29-90	5612.8	1325	550	120.8	7.7	S/230	126.3	7.8	95.6	-0.1	GC WITH SA & CB
231	06-29-90	5611.2	1270	470	119.5	7.6	H/230	126.3	7.8	***94.6***	-0.2	GC WITH SA & CB
159A	06-07-90	5601.0	1360	590	122.8	9.6	H/159	118.5	11.1	103.6	-1.5	GC WITH SA
232	07-04-90	5615.5	1300	586	125.3	7.7	S/232	124.4	9.0	100.7	-1.3	GC WITH SA & CB
235	07-05-90	5611.3	1302	432	124.5	10.1	S/235	122.9	10.0	101.3	0.1	GC WITH SA & CB
237	07-06-90	5615.5	1325	550	124.4	9.7	S/237	124.9	8.5	99.6	***1.2***	GC WITH SA & CB
238	07-06-90	5619.5	1343	635	126.4	9.0	H/237	124.9	8.5	101.2	0.5	GC WITH CB & SA
239	07-07-90	5619.5	1260	629	130.5	9.4	H/240	131.3	7.9	99.4	***1.5***	SC WITH GR & CB
240	07-07-90	5611.4	1375	329	133.7	5.7	S/240	131.3	7.9	101.8	-2.2	GC WITH SA & CB
244	07-07-90	5619.8	1312	545	129.9	5.7	H/240	131.3	7.9	98.9	-2.2	GC WITH SA & CB
255	07-11-90	5618.0	1295	360	126.5	8.9	H/262	122.5	9.9	103.3	-1.0	SC WITH GR
261	07-12-90	5626.0	1250	620	123.7	8.6	H/262	122.5	9.9	101.0	-1.3	SC WITH GR
277	07-18-90	5601.4	1460	575	134.0	6.7	S/277	134.0	6.7	100.0	0.0	GC-GM W SA & CB
278	07-18-90	5604.5	1470	680	135.1	7.4	H/268	132.4	7.1	102.0	0.3	GC WITH SA & CB
279	07-18-90	5601.0	1460	500	131.6	5.3	H/277	134.0	6.7	98.2	-1.4	GC WITH SA & CB
280	07-19-90	5600.0	1463	475	133.7	7.2	S/280	134.6	7.3	99.3	-0.1	GC-GM W SA & CB
281	07-19-90	5593.3	1488	245	136.2	6.0	H/268	132.4	7.1	102.9	-1.1	GC WITH SA & GR
282	07-19-90	5598.0	1481	318	135.1	7.8	S/282	124.5	9.7	108.5	-1.9	SC WITH GR & CB
283	07-19-90	5611.0	1445	700	133.8	7.8	H/282	124.5	9.7	107.5	-1.9	GC WITH SA & CB
284	07-20-90	5601.0	1486	363	131.1	7.9	S/284	125.4	8.3	104.5	-0.4	GC WITH SA & CB
286	07-21-90	5601.0	1480	270	129.4	8.5	H/287	125.5	8.7	103.1	-0.2	GC WITH SA & CB
287	07-21-90	5608.0	1459	510	121.0	8.8	S/287	125.5	8.7	96.4	0.1	GC WITH SA & CB
288	07-21-90	5603.7	1480	329	119.6	9.3	H/287	125.5	8.7	95.3	0.6	GC WITH SA & CB
290	07-21-90	5616.7	1478	677	124.9	8.6	H/287	125.5	8.7	99.5	-0.1	GC WITH SA & CB
294	07-22-90	5620.5	1430	721	126.4	8.2	S/294	126.2	8.8	100.2	-0.6	SC WITH GR & CB
296	07-22-90	5618.1	1328	588	124.1	7.2	S/296	125.2	7.9	99.1	-0.7	GC WITH SA & CB
297	07-23-90	5613.5	1560	415	133.4	7.5	S/297	131.0	7.4	101.8	0.1	GC-GM W SA & CB
299	07-24-90	5609.3	1483	290	127.1	5.8	S/299	130.6	7.0	97.3	-1.2	GC-GM W SA & CB
301	07-24-90	5621.8	1363	654	131.8	7.6	H/300	128.4	7.5	102.6	0.1	GC WITH SA & CB
305	07-24-90	5614.5	1415	290	126.1	6.2	S/305	128.1	8.2	98.4	-2.0	GP-GC W SA & CB
306	07-25-90	5619.0	1350	500	134.9	7.8	S/306	132.4	8.1	101.9	-0.3	GC-GM W SA & CB
307	07-25-90	5617.0	1250	400	124.4	7.6	H/240	131.3	7.9	***94.7***	-0.3	GC WITH SA & CB
310	07-26-90	5618.5	1420	357	128.3	7.8	H/300	128.4	7.5	99.9	0.3	GC WITH SA & CB
311	07-26-90	5615.0	1500	320	126.2	8.5	S/311	129.6	7.8	97.4	0.7	GC-GM W SA & CB
312	07-26-90	5617.0	1440	485	132.2	9.1	3/312	130.4	7.5	101.4	***1.6***	SC WITH GR & CB
313	07-26-90	5623.7	1455	655	130.2	5.9	S/313	129.2	7.6	100.8	-1.7	GC WITH SA & CB
322	07-28-90	5626.0	1500	310	130.9	8.4	S/322	127.4	8.4	102.7	0.0	GC WITH SA & CB
314	07-26-90	5624.7	1300	555	130.8	7.9	S/314	126.6	9.2	103.3	-1.3	SC WITH GR & CB
315	07-26-90	5620.8	1310	310	126.3	8.5	H/282	124.5	9.7	101.4	-1.2	SC WITH GR & CB

TEST NUMBER	DATE	ELEV	LOCATION		FIELD		STANDARD LAB COMPACTION			PERCENT COMPACTION	PERCENT +- OMC	CLASSIFICATION
			STATION	OFFSET	DRY DENS (PCF)	MC %	TEST METH	MX DRY DEN	OMC %			
316	07-27-90	5620.8	1590	390	126.3	7.6	H/256	129.9	8.6	97.2	-1.0	GC WITH SA & CB
317	07-27-90	5620.7	1500	477	137.3	7.0	5/317	134.2	7.2	102.3	-0.2	GC WITH SA & CB
319	07-27-90	5626.0	1368	603	127.8	8.0	5/319	130.2	6.7	98.2	***1.3***	GC WITH SA & CB
320	07-28-90	5628.0	1415	500	134.2	8.4	3/320	129.0	8.4	104.0	0.0	GC WITH SA & CB
321	07-28-90	5629.0	1215	539	127.5	7.8	H/316	129.9	8.6	98.2	-0.8	GC WITH SA & CB
323	07-28-90	5622.8	1443	360	120.2	6.8	5/323	128.1	8.7	***93.8***	-1.9	GC-GM W SA & CB
326	07-29-90	5624.8	1510	600	128.4	6.7	H/319	129.2	7.6	99.4	-0.9	GC WITH SA & CB
324A	07-30-90	5626.2	1354	410	123.7	8.5	H/324	130.1	7.6	95.1	0.9	GC-GM W SA & CB
329	07-30-90	5631.5	1304	570	127.0	7.5	5/329	126.0	9.1	100.8	-1.6	GC WITH SA & CB
330	07-30-90	5628.3	1600	385	123.5	9.3	H/250	122.7	10.0	100.7	-0.7	SC WITH GR & CB
331	07-31-90	5631.7	1450	600	130.3	7.7	5/331	129.2	8.5	100.9	-0.8	GC-GM W SA & CB
334	07-31-90	5632.6	1350	500	130.8	5.5	5/334	132.1	8.1	99.0	-2.6	GC-GM W SA & CB
335	07-31-90	5629.0	1539	328	124.8	8.6	5/335	126.1	9.6	99.0	-1.0	GC-GM W SA & CB
336	08-01-90	5633.0	1384	455	135.9	6.8	5/336	133.6	6.7	101.7	0.1	GC WITH SA & CB
337	08-01-90	5629.5	1325	300	130.4	7.1	H/313	129.2	7.6	100.9	-0.5	GC WITH SA & CB
339	08-01-90	5634.1	1455	450	123.5	10.3	5/339	123.7	10.1	99.8	0.2	GC WITH SA & CB
340	08-01-90	5636.3	1223	400	135.2	7.0	H/306	132.4	8.1	102.1	-1.1	GC WITH SA & CB
341	08-02-90	5636.5	1285	450	129.2	7.7	5/341	133.7	7.9	96.6	-0.2	GC-GM W SA & CB
342	08-02-90	5638.0	1210	400	118.8	8.8	H/252	122.8	9.6	96.7	-0.8	SC WITH GR & CB
343	08-02-90	5638.5	1500	550	133.1	8.3	H/280	134.6	7.3	98.9	1.0	GC-GM W SA & CB
344	08-03-90	5639.0	1450	425	125.0	8.2	H/300	128.4	7.5	97.4	0.7	GC WITH SA & CB
345	08-03-90	5638.4	1400	548	131.1	6.6	5/345	134.4	6.8	97.5	-0.2	GC WITH SA & CB
346	08-03-90	5639.7	1550	550	121.9	8.9	5/346	124.5	8.9	97.9	0.0	SC WITH GR & CB
347	08-04-90	5639.0	1350	375	127.5	10.5	5/347	126.3	9.2	101.0	***1.3***	SC WITH GR & CB
347A	08-04-90	5641.1	1413	532	127.4	5.4	5/347A	133.4	7.0	95.5	-1.6	GC WITH SA & CB
348	08-06-90	5639.9	1435	484	132.0	9.2	5/348	130.3	7.6	101.3	***1.6***	SC WITH GR & CB
349	08-06-90	5639.0	1346	400	128.7	7.6	5/349	131.6	8.4	97.8	-0.8	GC WITH SA & CB
350	08-07-90	5639.5	1550	350	129.2	9.5	5/350	128.2	8.3	100.8	***1.2***	GC WITH SA & CB
350A	08-07-90	5640.8	1573	400	112.7	8.5	5/350A	127.3	8.4	***88.5***	0.1	GC WITH SA & CB
351	08-07-90	5642.5	1650	410	125.7	8.7	5/351	125.3	9.0	100.3	-0.3	SC WITH GR & CB
352	08-08-90	5644.4	1600	550	129.6	8.1	5/352	127.3	8.8	101.8	-0.7	GC WITH SA & CB
350B	08-08-90	5641.7	1573	376	132.2	8.1	H/351	125.3	9.0	105.5	-0.9	SC WITH GR & CB
351A	08-08-90	5643.7	1560	515	127.9	4.5	5/351A	133.3	6.7	95.9	-2.2	GC WITH SA & CB
353	08-09-90	5640.4	1508	377	133.3	6.6	5/353	131.7	8.4	101.2	-1.8	GC-GM W SA & CB
354	08-09-90	5645.1	1437	498	132.2	6.7	5/354	129.7	8.1	101.9	-1.4	GC WITH SA & CB
355	08-09-90	5646.8	1420	460	131.7	7.6	5/355	128.7	7.7	102.3	-0.1	GC-GM W SA & CB
356	08-10-90	5647.7	1575	470	132.2	6.8	5/356	128.6	8.1	102.8	-1.3	GC WITH SA & CB
357	08-10-90	5649.3	1705	450	126.7	6.2	H/350B	132.2	8.1	95.8	-1.9	GC WITH SA
358	08-10-90	5648.1	1642	510	136.7	6.1	5/358	133.0	6.9	102.8	-0.8	GC WITH SA & CB
359	08-10-90	5645.6	1287	398	136.8	6.0	5/359	131.5	8.1	104.0	-2.1	GC-GM W SA & CB
361	08-10-90	5648.2	1500	470	123.5	7.5	5/361	126.6	9.5	97.6	-2.0	GC WITH SA & CB
362	08-11-90	5650.0	1329	500	121.7	8.0	5/362	128.7	8.4	***94.6***	-0.4	GC WITH SA & CB
363	08-11-90	5645.0	1680	429	132.5	6.9	5/363	132.0	6.5	100.4	0.4	GC WITH SA & CB
364	08-12-90	5650.0	1350	470	133.1	7.4	5/364	130.2	8.3	102.2	-0.9	GC WITH SA & CB
365	08-12-90	5649.0	1560	450	130.9	7.2	H/341	133.7	7.9	97.9	-0.7	GC WITH SA & CB
366	08-12-90	5648.5	1330	385	130.1	5.0	H/341	133.7	7.9	97.3	-2.9	GC WITH SA & CB
367	08-13-90	5649.3	1426	435	133.4	5.0	5/367	129.4	8.0	103.1	-3.0	GC-GM W SA & CB
369	08-14-90	5653.0	1575	450	128.1	8.3	5/369	126.3	8.4	101.4	-0.1	GC WITH SA & CB
374	08-15-90	5668.4	2313	400	121.5	7.2	H/350	128.2	8.3	***94.8***	-1.1	SC WITH GR & CB
375	08-15-90	5667.9	2225	297	123.2	7.2	H/127	121.0	10.2	101.8	-3.0	SC WITH GR & CB
376	08-15-90	5653.6	1625	460	127.4	7.2	5/376	128.4	8.1	99.2	-0.9	GC WITH SA & CB
378	08-15-90	5656.0	1350	490	127.3	7.1	5/378	129.5	7.5	98.3	-0.4	GC-GM W SA & CB

QUALITY ACCEPTANCE TESTING - COMPACTION REPORT REPORT NUMBER: RII.2

TEST NUMBER	DATE	ELEV	LOCATION STATION	LOCATION OFFSET	FIELD DRY DENS (PCF)	FIELD MC %	STANDARD LAB COMPACTION TEST METH	STANDARD LAB COMPACTION MX DRY DEN	STANDARD LAB COMPACTION OMC %	PERCENT COMPACTION	PERCENT +- OMC	CLASSIFICATION
379	08-15-90	5656.5	1175	460	132.2	7.7	H/354	129.7	8.1	101.9	-0.4	GC WITH SA & CB
380	08-15-90	5654.9	1790	450	130.8	7.1	H/381	128.1	8.1	102.1	-1.0	GC WITH SA & CB
381	08-16-90	5653.0	1690	415	128.8	7.5	5/381	128.1	8.1	100.5	-0.6	GC WITH SA & CB
385	08-17-90	5656.2	1680	495	126.6	10.8	5/385	126.2	9.6	100.3	**1.2**	GC WITH SA & CB
385A	08-17-90	5656.2	1680	495	131.9	6.8	H/385	126.2	9.6	104.5	-2.8	GC WITH SA & CB
386	08-17-90	5657.8	1300	500	135.9	6.0	5/386	131.2	8.1	103.6	-2.1	GC WITH SA & CB
387A	08-18-90	5660.5	1300	500	131.5	7.0	H/387	128.8	8.9	102.1	-1.9	GC WITH SA & CB
388	08-18-90	5658.3	1640	450	129.1	6.8	5/388	135.9	6.9	**95.0**	-0.1	GC-GM W SA & CB
389	08-18-90	5659.0	1600	480	132.2	8.1	5/389	130.7	7.2	101.1	0.9	GC WITH SA & CB
390	08-20-90	5662.0	1205	350	126.1	8.6	H/285	123.7	9.5	101.9	-0.9	GC WITH SA & CB
391	08-20-90	5657.2	1800	400	134.6	6.7	H/322	127.8	8.0	105.3	-1.3	SC WITH GR & CB
393	08-20-90	5660.9	1500	500	126.9	7.5	5/393	127.6	8.9	99.5	-1.4	GM WITH SA & CB
396	08-20-90	5660.0	1500	400	127.9	8.5	5/396	130.2	7.4	98.2	**1.1**	GC WITH SA & CB
397	08-21-90	5660.5	1625	450	127.1	9.4	5/397	128.4	8.0	99.0	**1.4**	GC WITH SA & CB
398	08-21-90	5664.8	1160	450	129.9	8.4	H/369	128.1	8.3	101.4	0.1	GC WITH SA & CB
401	08-21-90	5670.0	2350	400	135.6	5.1	H/389	130.7	7.2	103.7	-2.1	GC WITH SA & CB
403	08-21-90	5662.0	1200	480	123.2	5.4	5/403	129.1	8.1	95.4	-2.7	GC WITH SA & CB
405	08-22-90	5664.2	1435	470	131.9	5.0	5/405	134.5	7.1	98.1	-2.1	GC-GM W SA & CB
407	08-22-90	5663.5	1710	450	133.1	7.6	5/407	128.0	9.2	104.0	-1.6	GC-GM W SA & CB
408	08-23-90	5671.4	2370	450	131.0	7.1	H/407	128.0	9.2	102.3	-2.1	GC WITH SA & CB
409	08-23-90	5667.0	1640	485	124.0	7.9	5/409	128.0	8.1	96.9	-0.2	GC-GM W SA & CB
410	08-23-90	5670.0	2225	350	135.7	5.6	H/405	134.5	7.1	100.9	-1.5	GC WITH SA & CB
411	08-23-90	5663.0	1750	420	134.8	7.1	5/411	131.4	7.7	102.6	-0.6	GP-GC W SA & CB
412	08-24-90	5669.0	1250	500	123.4	9.5	5/412	129.8	8.2	95.1	**1.3**	GC-GM W SA & CB
413	08-24-90	5672.6	2250	365	126.3	7.2	H/403	129.1	8.1	97.8	-0.9	GC WITH SA & CB
415	08-24-90	5665.7	1700	490	137.6	6.4	5/415	131.4	7.0	104.7	-0.6	GP-GC W SA & CB
416	08-25-90	5668.0	1520	420	131.4	7.5	5/416	129.6	9.5	101.4	-2.0	GC WITH SA & CB
419	08-27-90	5672.4	2235	310	128.2	8.1	H/403	129.1	8.1	99.3	0.0	GC WITH SA & CB
420	08-27-90	5675.7	2350	415	133.5	8.1	H/405	134.5	7.1	99.3	1.0	GC WITH SA & CB
421	08-27-90	5670.4	1305	465	133.4	6.1	5/421	130.8	8.4	102.0	-2.3	GC WITH SA & CB
422	08-27-90	5675.0	2340	375	131.5	8.2	5/422	131.8	7.4	99.8	0.8	GC-GM W SA & CB
423	08-28-90	5671.0	1565	520	136.1	7.4	5/423	129.6	6.9	105.0	0.5	GC WITH SA & CB
424	08-28-90	5670.2	1550	500	135.1	6.4	H/415	131.4	7.0	102.8	-0.6	GC WITH CB & SA
425	08-28-90	5670.0	1515	435	142.4	4.6	5/425	131.3	7.8	108.5	**-3.2**	GC WITH SA & CB
426	08-29-90	5674.8	1250	500	119.7	9.2	5/426	127.6	9.2	**93.8**	0.0	GC WITH SA & CB
427	08-29-90	5677.9	1150	350	119.0	8.7	H/385	126.2	9.6	**94.3**	-0.9	GC WITH SA & CB
428	08-29-90	5676.5	2300	310	138.0	5.8	H/425	131.8	7.8	104.7	-2.0	GC WITH SA & CB
429	08-30-90	5678.0	1400	450	126.4	9.1	5/429	125.9	9.2	100.4	-0.1	GC-GM W SA & CB
430	08-31-90	5675.0	1600	400	126.1	6.9	5/430	124.9	8.8	101.0	-1.9	GC WITH SA & CB
431	09-05-90	5660.0	1950	450	123.1	11.1	5/431	126.4	9.2	97.4	**1.9**	SC WITH GR & CB
432	09-04-90	5677.0	1145	405	125.7	7.4	H/426	127.6	9.2	98.5	-1.8	GC WITH SA & CB
433	09-05-90	5679.0	1440	445	130.2	7.1	H/425	131.8	7.8	98.8	-0.7	GC WITH SA & CB
437	09-06-90	5679.0	1250	400	128.1	7.1	5/437	130.7	8.1	98.0	-1.0	GC WITH SA & CB
438	09-06-90	5661.5	1952	460	133.2	7.5	H/425	131.8	7.8	101.1	-0.3	GC WITH SA & CB
439	09-07-90	5662.5	1875	405	130.8	6.7	5/439	131.8	7.0	99.2	-0.3	GC WITH SA & CB
445	09-10-90	5665.5	1925	475	138.6	5.0	5/445	131.9	7.6	105.1	-2.6	GC-GM W SA & CB
448	09-11-90	5665.8	1815	430	129.1	7.2	5/448	133.5	7.2	96.7	0.0	GC-GM W SA & CB
451	09-12-90	5671.0	2000	335	134.1	6.2	5/451	132.1	7.8	101.5	-1.6	GC WITH SA & CB
458	09-14-90	5676.3	1950	425	126.5	6.8	5/455	124.3	9.1	101.8	-2.3	GC WITH SA & CB
459	09-17-90	5674.0	1850	340	135.8	6.2	H/448	133.5	7.2	101.7	-1.0	GC WITH CB & SA
460	09-17-90	5675.0	1750	485	128.3	7.0	5/460	132.2	7.4	97.0	-0.4	GC-GM W SA & CB
462	09-18-90	5679.3	1595	435	134.0	7.8	5/462	131.0	8.0	102:3	-0.2	GC WITH SA & CB

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464	09-21-90	5682.0	1260	400	139.3	6.2	H/415	131.4	7.0	106.0	-0.8	GP-GC W CB & SA
465	09-21-90	5681.0	2270	350	129.0	9.4	5/465	127.5	8.6	101.2	0.8	GC WITH SA & CB
479	09-24-90	5683.0	2350	260	132.0	7.5	H/425	131.8	7.8	100.2	-0.3	GC WITH SA & CB
482	09-25-90	5683.0	2200	390	129.1	7.4	5/482	132.0	7.2	97.8	0.2	GC-GM W SA & CB
484	09-25-90	5683.0	1275	390	137.2	6.5	5/484	130.3	7.9	105.3	-1.4	GC WITH SA & CB
486	09-26-90	5682.0	2080	400	136.3	7.3	5/486	131.8	7.8	103.4	-0.5	GC-GM W SA & CB
489	09-27-90	5686.0	2150	385	133.6	7.3	5/489	128.5	8.5	104.0	-1.2	GC WITH SA & CB
493	09-28-90	5686.5	2050	425	121.8	8.6	5/493	127.3	8.4	95.7	0.2	GC WITH SA & CB
499	10-01-90	5688.0	1200	405	124.7	7.6	H/484	130.3	7.9	95.7	-0.3	GC WITH SA & CB
500	10-01-90	5685.5	2350	350	136.4	6.3	5/500	128.2	8.6	106.4	-2.3	GC WITH CB & SA
503	10-02-90	5686.3	1625	400	130.8	6.0	5/503	130.7	8.5	100.1	-2.5	GC-GM W SA & CB
506	10-04-90	5690.1	2150	375	131.7	6.6	5/506	131.8	7.5	99.9	-0.9	GC-GM W SA & CB
520	10-09-90	5593.0	1540	175	132.6	7.6	5/520	131.7	7.8	100.7	-0.2	SC-SM W GR & CB
528	10-11-90	5592.6	1525	175	132.7	8.1	5/528	131.0	7.8	101.3	0.3	GC WITH SA & CB
544	10-17-90	5593.0	1450	125	132.4	7.2	H/528	131.0	7.8	101.1	-0.6	GC WITH SA & CB
571	10-26-90	5585.0	1550	70	135.1	7.0	H/486	131.8	7.8	102.5	-0.8	GC WITH CB & SA
576	10-27-90	5585.9	1500	97	128.1	8.2	H/463	133.5	7.2	96.0	1.0	GC WITH SA & CB
592	10-30-90	5591.0	1475	100	118.1	7.6	H/287	124.8	9.3	**94.6**	-1.7	GC WITH SA & CB
598	10-31-90	5679.0	1752	480	133.8	6.1	H/479	132.0	7.5	101.4	-1.4	GC WITH SA & CB
592A	10-31-90	5592.5	1425	85	128.1	6.9	H/284	125.4	8.3	102.2	-1.4	GC WITH SA
586	10-29-90	5588	1565	150	130.6	8.3	5/586	135.0	8.4	96.7	-0.1	GM WITH SA & CB
946	07-23-91	5599.1	1450	70	123.9	5.6	5/946	132.8	6.9	**93.3**	-1.3	GC WITH CB & SA
959	07-25-91	5605.7	1565	156	130.6	6.6	4/959	132.7	7.2	98.4	-0.6	GC-GM W SA & CB
973	07-26-91	5603.1	1450	110	120.8	10.8	4/973	121.8	10.2	99.2	0.6	GC WITH SA & CB
982	07-29-91	5607.6	1450	182	125.5	8.5	4/982	124.3	8.9	101.0	-0.4	GC WITH SA & CB
999	07-31-91	5605.7	1380	180	114.8	11.6	H/293	132.4	6.7	**86.7**	**4.9**	GC WITH CB & SA
1006	08-02-91	5612.5	1400	200	124.0	8.5	5/1006	124.5	9.8	99.6	-1.3	GC WITH SA & CB
1010	08-02-91	5614.5	1450	133	129.7	8.1	5/1010	124.3	9.2	104.3	-1.1	GC WITH SA & CB
1023	08-06-91	5619.5	1550	140	123.9	9.3	5/1023	125.6	9.1	98.6	0.2	GC WITH SA & CB
1028	08-06-91	5620.7	1500	110	127.1	8.9	5/1028	126.5	9.0	100.5	-0.1	GC WITH SA & CB
1038	08-07-91	5621.5	1545	78	122.3	10.4	5/1038	128.0	8.0	95.5	**2.4**	GC WITH SA & CB
1049	08-08-91	5623.6	1445	150	125.5	8.3	5/1049	126.1	8.1	99.5	0.2	GC WITH SA & CB
1060	08-09-91	5627.0	1540	150	122.4	9.4	5/1060	123.8	9.8	98.9	-0.4	GC WITH SA & CB
1067	08-10-91	5617.6	1575	75	128.6	8.1	H/503	130.7	8.5	98.4	-0.4	GC WITH SA & CB
1077	08-12-91	5627.4	1400	275	119.2	11.3	5/1077	125.1	9.3	95.3	**2.0**	GC WITH SA & CB
1084	08-13-91	5631.2	1440	265	126.3	9.6	H/1006	124.5	9.8	101.4	-0.2	GC WITH SA & CB
1087	08-14-91	5624.4	1591	286	122.7	10.9	5/1087	119.6	10.7	102.6	0.2	GC WITH SA
1099	08-16-91	5632.8	1625	95	133.8	6.5	H/262	127.0	8.2	105.4	-1.7	GC WITH SA
1111	08-17-91	5633.1	1390	175	120.1	10.4	5/1111	121.6	10.0	98.8	0.4	GC WITH SA
1120	08-19-91	5632.2	1420	95	118.2	11.5	H/129	117.7	12.3	100.4	-0.8	SC WITH GR
1129	08-21-91	5637.1	1585	223	124.9	8.2	5/1129	122.4	10.0	102.0	-1.8	GC WITH SA
1140	08-21-91	5641.0	1635	235	121.6	9.2	H/1129	122.4	10.0	99.3	-0.8	GC WITH SA & CB
1150	08-22-91	5639.6	1400	165	122.7	11.3	4/1150	123.5	10.3	99.4	1.0	GC WITH SA & CB
1152	08-23-91	5641.1	1675	120	122.8	11.0	H/1006	124.5	9.8	98.6	**1.2**	GC WITH SA & CB
1154	08-23-91	5639.6	1600	50	121.8	10.1	5/1154	122.4	9.7	99.5	0.4	GC WITH SA & CB
1188	08-24-91	5643.3	1525	250	126.6	7.8	H/520	131.7	7.8	96.1	0.0	GC WITH SA & CB
1235	08-29-91	5644.2	1550	250	122.8	10.9	4/1235	123.3	10.0	99.6	0.9	GC WITH SA & CB
1243	08-31-91	5639.0	1330	98	120.4	11.7	H/973	121.8	10.2	98.9	**1.5**	GC WITH SA & CB
1250	08-31-91	5644.3	1370	220	121.4	9.3	4/1250	120.1	9.3	101.1	0.0	GC WITH SA & CB
1252	08-31-91	5647.8	1650	350	123.3	10.6	H/1006	124.5	9.8	99.0	0.8	GC WITH CB & SA
1256	09-03-91	5646.3	1400	286	125.8	8.6	4/1256	122.6	9.1	102.6	-0.5	GC WITH SA
1259	09-03-91	5643.9	1550	90	118.4	10.1	H/1048	120.1	11.3	98.6	-1.2	GC WITH SA & CB

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1262	09-04-91	5648.5	1530	300	123.4	10.4	4/1262	118.2	11.7	104.4	-1.3	SA CL WITH GR
1275	09-05-91	5649.6	1530	300	123.7	9.6	H/1150	123.5	10.3	100.2	-0.7	GC WITH SA & CB
1314	09-18-91	5650.3	1400	270	128.4	7.5	3/1314	121.0	10.6	106.1	***-3.1***	GC WITH SA & CB
1318	09-19-91	5653.0	1557	264	116.3	9.3	2/1318	120.8	10.5	96.3	-1.2	GC WITH SA & CB
1324	09-20-91	5650.3	1300	180	125.9	8.0	4/1324	122.8	8.6	102.5	-0.6	GC WITH SA & CB
1330	09-22-91	5656.6	1585	380	125.6	8.3	H/1150	123.5	10.3	101.7	-2.0	GC WITH SA & CB
1334	09-22-91	5652.4	1450	130	122.7	8.6	H/115	116.8	12.4	105.1	***-3.8***	GC WITH SA & CB
1338	09-23-91	5651.3	2000	100	119.8	8.1	H/1250	120.1	9.3	99.8	-1.2	GC WITH SA & CB
1334A	09-24-91	5651.6	1450	130	127.8	7.4	4/1334A	124.6	9.0	102.6	-1.6	GC WITH SA & CB
1350	09-25-91	5653.6	1561	61	124.7	7.4	H/1049	126.1	8.1	98.9	-0.7	GC WITH SA & CB
1350A	09-25-91	5653.6	1561	61	128.7	9.1	H/1350	126.1	8.1	102.1	1.0	GC WITH SA & CB
1358	09-26-91	5660.3	1700	330	112.6	13.0	4/1358	112.6	12.9	100.0	0.1	GC WITH SA & CB
1358A	09-28-91	5659.1	1695	335	117.8	8.9	5/1358A	125.6	8.9	***93.8***	0.0	GC WITH SA & CB
1360A	09-29-91	5658.0	1620	210	121.7	8.3	4/1360A	127.4	9.1	95.5	-0.8	GC WITH SA & CB
1368	09-30-91	5658.1	1600	88	121.5	7.1	4/1368	128.0	7.9	***94.9***	-0.8	GC WITH SA & CB
1368A	10-01-91	5657.9	1597	91	137.8	7.1	H/1368	128.0	7.9	107.7	-0.8	GC WITH SA & CB
1372	10-01-91	5659.4	1512	296	129.5	8.6	H/1324	122.8	8.6	105.5	0.0	GC WITH SA & CB
1376	10-01-91	5659.9	1972	117	124.8	9.5	4/1376	127.8	8.6	97.7	0.9	GC WITH SA & CB
1391	10-03-91	5660.0	1707	184	114.2	10.8	2/1391	122.5	8.0	***93.2***	***2.8***	GC WITH SA & CB
1396	10-04-91	5660.0	1515	88	122.7	10.7	4/1396	116.5	12.1	105.3	-1.4	SC WITH GR & CB
1401	10-05-91	5660.8	1445	240	120.6	10.6	H/1187	120.4	10.5	100.2	0.1	GC WITH SA & CB
1396A	10-05-91	5660.0	1515	95	125.1	8.6	4/1396A	122.9	9.5	101.8	-0.9	GC WITH SA & CB
1407	10-06-91	5662.9	1959	165	115.9	10.4	4/1407	114.8	13.0	101.0	-2.6	GC WITH SA & CB
1414	10-07-91	5665.1	1878	300	126.3	9.3	H/1111	121.6	10.0	103.9	-0.7	GC WITH SA & CB
1419	10-08-91	5663.2	1485	175	117.4	9.2	4/1419	124.5	8.8	***94.3***	0.4	GC WITH SA & CB
1428	10-10-91	5667.1	1615	315	128.1	9.8	H/1250	120.1	9.3	106.7	0.5	GC WITH SA & CB
1452	10-11-91	5666.8	1985	292	126.7	9.9	4/1452	125.6	8.3	100.9	***1.6***	GC WITH SA & CB
1456	10-11-91	5663.1	1383	173	123.8	8.2	H/1376	127.8	8.6	96.9	-0.4	GC WITH SA & CB
1462	10-12-91	5664.4	2088	200	119.5	10.8	4/1462	117.7	11.2	101.5	-0.4	GC WITH SA & CB
1464	10-13-91	5664.3	2120	63	125.8	8.8	H/1129	122.4	10.0	102.8	-1.2	GC WITH SA & CB
1467	10-14-91	5668.1	1489	317	123.4	9.6	4/1467	122.1	8.0	101.1	***1.6***	GC WITH CB & SA
1470	10-16-91	5668.7	2102	275	124.0	9.1	4/1470	119.6	10.3	103.7	-1.2	GC WITH SA & CB
1472	10-16-91	5669.0	1969	277	127.1	7.9	H/1006	124.5	9.8	102.1	-1.9	GC WITH SA & CB
1483	10-17-91	5668.7	1335	325	122.3	10.0	3/1183	120.3	11.5	101.7	-1.5	GC WITH SA & CB
1491	10-18-91	5675.4	1700	404	131.1	6.9	2/1491	126.8	7.8	103.4	-0.9	GC WITH CB & SA
1493	10-19-91	5668.5	1431	94	125.0	10.1	3/1493	122.7	9.8	101.9	0.3	GC WITH SA & CB
1499	10-21-91	5668.7	1550	224	131.4	8.9	H/1006	124.5	9.8	105.5	-0.9	GC WITH SA & CB
1513	03-16-92	5675.9	1550	362	126.3	9.2	H/1129	122.4	10.0	103.2	-0.8	GC WITH SA & CB
1552	03-31-92	5675.0	1500	280	120.2	11.1	5/1552	121.5	10.5	98.9	0.6	SC WITH GR & CB
1565	04-03-92	5672.5	1550	165	123.1	10.9	4/1565	122.8	9.9	100.2	1.0	GC WITH SA & CB
1567	04-06-92	5674.5	1800	170								SC WITH GR & CB
1565A	04-06-92	5672.1	1560	170	121.3	8.8	H/1565	122.8	9.9	98.8	-1.1	GC WITH SA & CB
1574	04-07-92	5681.7	1550	380	116.4	11.4	4/1574	123.1	10.6	***94.6***	0.8	GC WITH SA & CB
1567A	04-08-92	5674.5	1800	170	125.4	8.5	4/1567A	121.1	10.0	103.6	-1.5	SC WITH GR & CB
1585	04-09-92	5673.4	2050	180	129.7	8.5	4/1585	121.4	10.6	106.8	-2.1	GC WITH SA & CB
1602	04-10-92	5674.0	1925	105	127.1	9.6	4/1602	125.8	8.6	101.0	1.0	GC WITH SA & CB
1609	04-14-92	5677.9	1950	244	116.5	14.0	4/1609	124.7	9.4	***93.4***	***4.6***	GC WITH SA & CB
1618	04-25-92	5678.4	1950	244	128.9	9.4	4/1618	119.6	11.9	107.8	-2.5	GC WITH SA & CB
1629	04-25-92	5677.3	1950	138	131.3	9.1	4/1629	129.7	8.9	101.2	0.2	GC WITH CB & SA
1643	04-27-92	5677.2	1570	249	134.7	8.2	4/1643	132.5	8.2	101.7	0.0	GC WITH SA & CB
1644	04-26-92	5681.0	1381	401	127.5	8.0	4/1644	125.7	8.7	101.4	-0.7	GC WITH SA & CB
1656	04-28-92	5676.5	1303	181	127.0	10.0	4/1656	123.0	10.0	103.3	0.0	GC WITH SA & CB

QUALITY ACCEPTANCE TESTING - COMPACTION REPORT   REPORT NUMBER: RII.2

TEST NUMBER	DATE	ELEV	LOCATION STATION	LOCATION OFFSET	FIELD DRY DENS (PCF)	FIELD MC %	STANDARD LAB COMPACTION TEST METH	STANDARD LAB COMPACTION MX DRY DEN	STANDARD LAB COMPACTION OMC %	PERCENT COMPACTION	PERCENT +- OMC	CLASSIFICATION
1662	04-29-92	5677.5	2252	161	130.6	7.0	4/1662	127.7	8.7	102.3	-1.7	GC WITH SA & CB
1671	04-30-92	5676.6	2101	291	136.1	7.7	4/1671	131.6	7.6	103.4	0.1	GC WITH SA & CB
1677	05-02-92	5679.8	1660	223	129.1	9.7	4/1677	126.7	9.4	101.9	0.3	GC WITH SA & CB
1679	05-02-92	5682.0	1550	260	124.9	10.2	4/1679	126.6	8.7	98.7	***1.5***	GC WITH SA & CB
1681	05-02-92	5685.6	1348	367	130.8	8.5	4/1681	125.8	9.5	104.0	-1.0	GC WITH SA & CB
1685	05-02-92	5683.0	2075	265	126.6	7.0	4/1685	123.9	9.1	102.2	-2.1	GC WITH SA & CB
1689	05-04-92	5684.5	1975	270	123.1	11.1	4/1689	126.6	9.3	97.2	***1.8***	GC WITH SA & CB
1691	05-05-92	5681.0	1775	195	136.5	7.1	5/1691	128.1	8.1	106.6	-1.0	GC WITH SA & CB
1697	05-06-92	5682.7	1839	126	129.1	9.2	4/1697	128.5	8.4	100.5	0.8	GC WITH SA & CB
1698	05-06-92	5680.0	1606	78	131.5	7.3	4/1698	131.5	7.8	100.0	-0.5	GC WITH SA & CB
1704	05-10-92	5684.7	2050	205	127.5	6.9	4/1704	127.5	8.4	100.0	-1.5	GC WITH SA & CB
1713	05-14-92	5681.8	1450	140	129.0	10.0	4/1713	123.0	10.0	104.9	0.0	GC WITH SA & CB
1714	05-12-92	5686.7	1450	350								GC WITH SA & CB
1714A	05-13-92	5686.7	1500	315	117.5	9.6	4/1714A	120.5	10.6	97.5	-1.0	SC WITH GR & CB
1719	05-14-92	5685.4	2270	75	131.7	8.8	4/1719	124.6	9.5	105.7	-0.7	GC WITH SA & CB
1722	05-15-92	5682.4	1300	121	130.4	8.2	4/1722	123.3	10.6	105.8	-2.4	GC WITH SA & CB
1719A	05-15-92	5685.1	2270	75	128.9	10.0	H/1719	124.6	9.5	103.5	0.5	GC WITH SA & CB
1733	05-17-92	5687.8	1909	184	122.4	11.2	4/1733	128.9	8.9	***95.0***	***2.3***	GC WITH SA & CB
1735	05-18-92	5687.1	1300	280	117.1	10.1	4/1735	122.7	10.1	95.4	0.0	GC WITH SA & CB
1739	05-19-92	5687.3	1800	63	122.7	11.5	4/1739	120.4	11.4	101.9	0.1	GC WITH SA & CB
1740	05-20-92	5688.2	2100	196	126.1	10.3	4/1740	120.4	11.3	104.7	-1.0	GC WITH SA & CB
1743	05-26-92	5687.2	1600	180	120.9	9.3	4/1743	121.4	10.5	99.6	-1.2	GC WITH SA & CB
1748	05-27-92	5686.9	1550	75	129.7	7.7	4/1748	121.7	10.6	106.6	-2.9	GC WITH SA & CB
1749	05-27-92	5687.6	1700	190	124.8	8.8	4/1749	124.0	10.2	100.6	-1.4	GC WITH SA & CB
1758	05-28-92	5687.3	1400	185	124.9	10.4	4/1758	123.1	10.6	101.5	-0.2	GC WITH SA & CB
1763	05-29-92	5692.8	1650	340	124.3	11.0	4/1763	123.6	9.6	100.6	***1.4***	GC WITH SA & CB
1765	05-29-92	5689.7	1750	140	127.3	9.5	4/1765	122.6	10.6	103.8	-1.1	GC WITH SA & CB
1769	05-30-92	5689.7	1700	50	133.1	8.9	5/1769	124.6	10.2	106.8	-1.3	GC WITH SA & CB
1771	05-30-92	5691.2	1825	212	127.5	11.1	4/1771	124.3	10.8	102.6	0.3	GC WITH SA & CB
1763A	05-29-92	5692.1	1650	340	121.5	10.2	H/1763	123.6	9.6	98.3	0.6	GC WITH SA & CB
1775	06-01-92	5690.4	2050	55	120.2	9.6	5/1775	123.6	9.6	97.2	0.0	GC WITH SA & CB
1777	06-01-92	5690.7	2306	340	126.2	8.5	4/1777	124.9	10.4	101.0	-1.9	GC WITH SA & CB
1771A	05-31-92	5691.3	1825	212	129.2	9.7	H/1771	124.3	10.8	103.9	-1.1	GC WITH SA & CB
1781	06-01-92	5690.1	1620	95	128.1	8.4	4/1781	124.3	9.6	103.1	-1.2	GC WITH SA & CB
1785	06-01-92	5692.4	1550	340	127.8	10.3	4/1785	125.4	9.6	101.9	0.7	GC WITH SA & CB
1789	06-03-92	5692.1	2150	200	123.0	8.8	4/1789	127.9	8.3	96.2	0.5	GC WITH SA & CB
1790	06-03-92	5690.4	1550	110	130.5	8.9	4/1790	126.1	9.4	103.5	-0.5	GC WITH SA & CB
1795	06-04-92	5692.0	2190	240	116.7	10.2	4/1795	123.3	10.1	***94.6***	0.1	GC WITH SA & CB
1800	06-05-92	5691.1	1382	90	125.6	10.3	4/1800	125.5	9.1	100.1	***1.2***	GC WITH SA & CB
1802	06-05-92	5693.7	2200	120	129.0	9.8	4/1802	127.0	9.5	101.6	0.3	GC WITH CB & SA
1808	06-06-92	5693.3	2327	67	124.6	11.7	4/1808	123.2	10.7	101.1	1.0	GC WITH SA & CB
1812	06-08-92	5694.0	1240	31	124.6	10.0	4/1812	123.5	9.5	100.9	0.5	GC WITH SA & CB
1813	06-08-92	5695.3	2175	135	124.3	11.8	4/1813	121.9	10.8	102.0	1.0	SC WITH GR & CB
1816	06-08-92	5696.3	2352	240	121.7	8.9	4/1816	123.4	10.0	98.6	-1.1	GC WITH SA & CB
1823	06-10-92	5696.3	1450	300	125.8	10.8	4/1823	126.5	9.5	99.4	***1.3***	GC WITH SA & CB
1824	06-10-92	5694.4	1450	50	129.0	7.6	4/1824	128.8	8.1	100.2	-0.5	GC WITH CB & SA
1835	06-10-92	5696.3	2020	265	128.1	10.3	4/1835	124.4	9.4	103.0	0.9	GC WITH SA & CB
1841	06-11-92	5698.9	1800	323	126.0	10.2	4/1841	129.1	8.6	97.6	***1.6***	GC WITH SA & CB
1842	06-12-92	5697.7	1800	100	123.1	11.4	4/1842	122.6	10.9	100.4	0.5	GC WITH SA & CB
1844	06-13-92	5698.8	1700	240	117.9	12.7	4/1844	118.9	11.3	99.2	***1.4***	GC WITH SA & CB
1849	06-13-92	5696.7	1450	75	117.5	11.2	4/1849	125.2	9.7	***93.8***	***1.5***	GC WITH SA & CB
1851	06-18-92	5696.4	1500	150	125.7	8.9	4/1851	122.9	9.8	102.3	-0.9	SC WITH GR & CB

TEST NUMBER	DATE	ELEV	LOCATION STATION	LOCATION OFFSET	FIELD DRY DENS (PCF)	FIELD MC %	STANDARD LAB COMPACTION TEST METH	STANDARD LAB COMPACTION MX DRY DEN	STANDARD LAB COMPACTION OMC %	PERCENT COMPACTION	PERCENT +- OMC	CLASSIFICATION
1849A	06-18-92	5696.7	1450	75	122.8	9.6	4/1849A	123.9	9.6	99.1	0.0	GC WITH SA & CB
1853	06-18-92	5696.4	1300	282	118.5	11.6	4/1853	118.8	11.7	99.7	-0.1	GC WITH SA & CB
1853A	06-19-92	5699.0	1300	282	123.9	11.1	4/1853	118.8	11.7	104.3	-0.6	GC WITH SA & CB
1861	06-20-92	5700.4	2050	290	130.1	8.9	4/1861	123.3	9.6	105.5	-0.7	GC WITH SA & CB
1865	06-21-92	5699.4	1500	260	120.2	9.7	4/1865	118.9	11.0	101.1	-1.3	GC WITH SA & CB
1868	06-22-92	5700.6	1900	240	119.7	12.1	4/1868	122.3	10.2	97.9	**1.9**	GC WITH SA & CB
1870	06-22-92	5699.7	1352	120	114.4	11.7	4/1870	113.9	13.3	100.4	-1.6	GC WITH SA & CB
1878	06-23-92	5701.4	1430	277	117.7	9.9	4/1878	122.1	10.1	96.4	-0.2	GC WITH SA & CB
1880	06-24-92	5702.1	1487	177	116.5	10.0	4/1880	116.0	12.1	100.4	-2.1	GC WITH SA & CB
1886	06-25-92	5703.6	2050	146	124.8	8.8	4/1886	121.7	10.0	102.5	-1.2	GC WITH SA & CB
1890	06-25-92	5705.1	1865	225	124.6	10.2	4/1890	121.3	11.2	102.7	-1.0	GC WITH CB & SA
1895	06-25-92	5702.2	1262	60	110.5	12.2	4/1895	114.7	13.3	96.3	-1.1	GC WITH SA & CB
1897	06-26-92	5705.0	2250	205	124.3	11.6	4/1897	121.8	11.0	102.1	0.6	GC WITH SA & CB
1898	06-26-92	5705.7	1800	70	119.4	11.4	4/1898	114.2	13.6	104.6	-2.2	GC WITH SA & CB
1900	06-27-92	5706.6	1625	75	124.6	6.8	4/1900	124.0	9.9	100.5	**-3.1**	GC WITH SA & CB
1901	06-27-92	5706.1	1900	280	124.4	10.0	4/1901	119.9	11.1	103.8	-1.1	GC WITH SA & CB
1908	06-28-92	5708.3	2050	76	109.2	15.6	4/1908	112.9	14.4	96.7	**1.2**	GC WITH SA & CB
1910	06-28-92	5705.0	2305	315	124.6	10.8	4/1910	122.2	10.8	102.0	0.0	GC WITH SA & CB
1917	06-29-92	5705.1	1255	230	118.0	8.9	4/1917	125.8	9.3	**93.8**	-0.4	GC WITH SA & CB
1920	06-29-92	5707.8	2205	70	113.1	12.6	4/1920	119.8	11.2	**94.4**	**1.4**	GC WITH SA & CB
1923	07-02-92	5707.7	1200	290	119.6	11.6	4/1923	118.0	12.6	101.4	-1.0	GC WITH SA & CB
1933	07-03-92	5711.2	1561	55	115.8	11.9	4/1933	113.1	14.0	102.4	-2.1	GC WITH SA & CB
1935	07-03-92	5707.9	1400	267	133.7	8.7	4/1935	126.4	9.3	105.8	-0.6	GC WITH CB & SA
1940	07-06-92	5712.2	1680	280	114.0	7.2	4/1940	123.1	10.2	**92.6**	-3.0	GC WITH SA & CB
1941	07-06-92	5710.1	2300	95	120.0	8.5	4/1941	122.5	10.0	98.0	-1.5	GC WITH SA & CB
1942	07-06-92	5707.5	1244	167	125.9	9.4	4/1942	122.3	10.3	102.9	-0.9	GC WITH SA & CB
1946A	07-07-92	5710.7	1300	280	119.4	9.1	4/1946A	125.5	9.2	95.1	-0.1	GC WITH SA & CB
1953	07-08-92	5710.7	1550	215	127.9	10.5	4/1953	124.9	9.7	102.4	0.8	GC WITH CB & SA
1956	07-08-92	5711.2	2246	57	116.5	9.7	4/1956	119.7	12.1	97.3	-2.4	GC WITH SA & CB
1960	07-09-92	5712.7	2171	256	126.0	11.3	4/1960	127.1	8.8	99.1	**2.5**	GC WITH SA & CB
1964	07-09-92	5716.1	1500	70	120.8	11.3	4/1964	118.8	11.2	101.7	0.1	GC WITH SA & CB
1967	07-10-92	5717.7	1915	80	123.2	9.3	4/1967	124.4	9.4	99.0	-0.1	GC WITH SA & CB
1969	07-10-92	5709.7	2375	240	133.0	7.2	4/1969	127.4	8.7	104.4	-1.5	GC-GM W SA & CB
1972	07-11-92	5717.2	1760	135	124.8	10.9	4/1972	121.7	11.0	102.5	-0.1	GC WITH SA & CB
1973	07-14-92	5716.7	1850	260	122.3	10.8	4/1973	123.7	10.5	98.9	0.3	GC WITH SA & CB
1977	07-15-92	5717.6	1630	50	122.4	10.7	4/1977	123.2	10.2	99.4	0.5	GC WITH SA & CB
1979	07-15-92	5717.3	2125	280	124.0	9.6	4/1979	125.1	9.0	99.1	0.6	GC WITH SA & CB
1981	07-16-92	5719.4	1800	200	125.3	9.9	4/1981	122.0	10.2	102.7	-0.3	GC-GM W SA & CB
1984	07-17-92	5717.6	1920	115	123.0	8.4	4/1984	121.2	9.7	101.5	-1.3	GC WITH SA & CB
1986	07-16-92	5716.9	2242	276	124.4	9.0	4/1986	122.1	10.1	101.9	-1.1	GC WITH SA & CB
1990	07-17-92	5723.0	1880	130	120.4	11.5	4/1990	120.9	11.5	99.6	0.0	GC WITH SA & CB
1996	07-18-92	5716.6	2463	64	128.1	6.3	4/1996	125.6	8.7	102.0	-2.4	GC WITH SA & CB
1998	07-18-92	5717.8	1240	180	120.4	10.3	4/1998	122.8	10.1	98.0	0.2	GC WITH SA & CB
2004	07-18-92	5720.5	2090	54	122.8	8.8	4/2004	124.0	9.7	99.0	-0.9	GC WITH SA & CB
2007	07-19-92	5722.7	1752	190	117.5	10.4	4/2007	125.1	8.9	**93.9**	**1.5**	GC WITH SA & CB
2009	07-20-92	5722.3	2282	182	129.6	7.6	4/2009	130.2	8.1	99.5	-0.5	GC WITH SA & CB
2015	07-21-92	5725.3	1850	43	126.6	9.4	4/2015	126.7	9.2	99.9	0.2	GC WITH SA & CB
2019	07-21-92	5719.5	2239	45	123.7	10.6	4/2019	125.3	9.9	98.7	0.7	GC WITH SA & CB
2022	07-22-92	5722.7	1300	104	129.4	8.6	4/2022	125.2	9.5	103.4	-0.9	GC WITH SA & CB
2026	07-22-92	5725.0	1748	132	124.3	9.8	4/2026	122.1	10.6	101.8	-0.8	GC WITH SA & CB
2029	07-22-92	5722.2	2336	111	122.6	10.3	4/2029	124.1	9.9	98.8	0.4	GC WITH SA & CB
2030	07-23-92	5727.4	1681	217	125.7	8.6	4/2030	123.3	10.6	101.9	-2.0	SC WITH GR & CB

TEST NUMBER	DATE	ELEV	LOCATION STATION	LOCATION OFFSET	FIELD DRY DENS (PCF)	FIELD MC %	STANDARD LAB COMPACTION TEST METH	STANDARD LAB COMPACTION MX DRY DEN	STANDARD LAB COMPACTION OMC %	PERCENT COMPACTION	PERCENT +- OMC	CLASSIFICATION
2031	07-23-92	5723.4	1184	135	123.7	12.5	4/2031	122.6	9.9	100.9	**2.6**	GC WITH SA & CB
2034	07-23-92	5724.4	1300	70	120.1	8.8	4/2034	125.3	9.7	95.8	-0.9	GC WITH SA & CB
2039	07-24-92	5728.2	2008	70	121.8	11.7	4/2039	120.9	10.5	100.7	**1.2**	SC WITH GR & CB
2041	07-27-92	5726.8	2150	70	123.1	10.0	4/2041	122.4	10.9	100.6	-0.9	GC WITH SA & CB
2053	07-28-92	5728.5	1550	105	125.6	10.9	4/2053	124.4	8.9	101.0	**2.0**	GC WITH SA & CB
2062	07-29-92	5730.6	2050	196	125.4	10.0	4/2062	124.4	9.1	100.8	0.9	GC WITH SA & CB
2076	07-30-92	5731.0	1426	52	127.2	7.0	4/2076	128.3	8.7	99.1	-1.7	GC WITH SA & CB
2078	07-31-92	5730.6	1462	220	122.6	12.1	4/2078	124.8	9.7	98.2	**2.4**	SC WITH GR & CB
2083	07-31-92	5729.5	2350	65	123.7	11.9	4/2083	124.4	9.5	99.4	**2.4**	GC WITH SA & CB
2085	08-01-92	5731.6	1300	48	125.3	10.5	4/2085	125.3	11.5	100.0	-1.0	SC WITH GR & CB
2089	08-02-92	5731.8	1300	150	116.1	10.1	4/2089	122.7	9.5	**94.6**	0.6	GC WITH SA & CB
2092	08-02-92	5735.9	2050	60	121.2	10.7	4/2092	123.1	9.3	98.5	**1.4**	GC WITH SA & CB
2104	08-04-92	5733.3	1300	194	125.7	8.9	4/2104	127.8	8.7	98.4	0.2	GC WITH SA & CB
2109	08-04-92	5734.2	2350	70	119.5	10.7	4/2109	124.4	9.4	96.1	**1.3**	GC WITH SA & CB
2111	08-05-92	5734.7	1375	204	127.8	7.8	4/2111	127.7	8.4	100.1	-0.6	GC-GM W SA & CB
2117	08-05-92	5734.7	1200	40	120.1	11.2	4/2117	124.5	9.8	96.5	**1.4**	GC WITH SA & CB
2121	08-06-92	5735.0	2350	157	125.4	9.8	4/2121	121.9	10.9	102.9	-1.1	GC WITH SA & CB
2122	08-06-92	5739.3	1700	50	124.8	6.8	4/2122	127.7	6.8	97.7	0.0	GC WITH CB & SA
2123	08-07-92	5735.0	1243	201	121.0	10.3	4/2123	125.1	9.6	96.7	0.7	GC WITH SA & CB
2126	08-07-92	5735.2	2500	69	116.6	11.5	4/2126	121.5	10.3	96.0	**1.2**	GC WITH SA & CB
2128	08-08-92	5740.8	1625	105	121.9	7.5	4/2128	125.8	9.2	96.9	-1.7	GC WITH SA & CB
2129	08-10-92	5739.4	1719	176	126.2	10.1	4/2129	121.4	10.7	104.0	-0.6	SC WITH GR & CB
2133	08-11-92	5736.7	1174	150	114.3	11.4	4/2133	123.5	9.6	**92.6**	**1.8**	GC WITH CB & SA
2138	08-11-92	5739.0	1360	200	118.8	10.6	4/2138	123.4	9.6	96.3	1.0	GC WITH SA & CB
2139	08-11-92	5736.1	2548	73	119.1	9.9	4/2139	123.2	8.6	96.7	**1.3**	GC WITH SA & CB
2142	08-12-92	5740.4	1157	77	122.9	9.5	4/2142	127.4	8.7	96.5	0.8	GC WITH CB & SA
2147	08-13-92	5740.5	1409	181	121.3	10.4	4/2147	125.6	9.0	96.6	**1.4**	GC WITH SA & CB
2148	08-13-92	5740.6	2400	80	124.8	9.0	4/2148	130.7	7.9	95.5	**1.1**	GC WITH SA & CB
2162	08-13-92	5741.4	2150	185	133.2	7.6	4/2162	129.1	8.0	103.2	-0.4	GC WITH SA & CB
2165	08-14-92	5742.0	1500	80	128.4	7.3	4/2165	127.3	8.5	100.9	-1.2	GM WITH SA & CB
2174	08-14-92	5742.4	1400	120	125.8	7.8	4/2174	128.7	8.5	97.7	-0.7	GC WITH SA & CB
2177	08-14-92	5742.3	2150	177	131.7	7.6	4/2177	128.6	8.7	102.4	-1.1	GC WITH CB & SA
2179	08-15-92	5743.3	2245	91	122.7	9.3	4/2179	128.2	8.5	95.7	0.8	SC WITH GR & CB
2184	08-15-92	5740.4	2400	196	128.8	6.9	4/2184	124.0	10.2	103.9	**-3.3**	SC WITH GR & CB
2185	08-16-92	5743.2	2448	110	127.4	8.8	4/2185	132.6	7.2	96.1	**1.6**	GC WITH SA & CB
2190	08-18-92	5747.2	1600	42	121.3	9.7	4/2190	125.9	9.8	96.3	-0.1	GC WITH SA & CB
2187	08-17-92	5745.4	2040	190	127.0	10.3	4/2187	123.5	9.3	102.8	1.0	GC WITH SA & CB
2198	08-19-92	5748.9	1815	60	118.8	5.6	4/2198	122.7	10.3	96.8	**-4.7**	GC WITH SA & CB
2201	08-20-92	5747.4	1398	90	120.9	8.4	4/2201	126.7	7.9	95.4	0.5	GC WITH SA & CB
2207	08-21-92	5747.7	2403	72	128.4	7.1	4/2207	128.7	7.4	99.8	-0.3	GC WITH SA & CB
2208	08-21-92	5748.6	1230	140	125.6	8.7	4/2208	124.9	8.9	100.6	-0.2	GC WITH SA & CB
2211	08-22-92	5750.9	2050	49	127.7	6.9	4/2211	129.5	8.0	98.6	-1.1	GC WITH SA & CB
2214	08-22-92	5749.9	2319	37	122.7	10.3	4/2214	123.4	10.2	99.4	0.1	GC WITH SA & CB
2216	08-23-92	5752.5	1770	87	124.0	9.2	4/2216	122.0	9.7	101.6	-0.5	SC WITH GR & CB
2217	08-23-92	5750.5	1285	35	122.2	8.9	4/2217	123.3	9.6	99.1	-0.7	GC WITH SA & CB
2220	08-24-92	5753.1	1550	61	126.2	8.0	4/2220	126.1	8.8	100.1	-0.8	SC WITH GR & CB
2221	08-24-92	5754.6	1729	139	126.5	10.2	4/2221	126.8	9.4	99.8	0.8	GC WITH SA & CB
2225	08-25-92	5751.3	1350	150	118.4	10.3	4/2225	123.2	9.4	96.1	0.9	GC WITH SA & CB
2233	08-26-92	5756.3	1168	62	123.7	8.9	4/2233	129.4	8.5	95.6	0.4	SC WITH GR & CB
2226A	08-27-92	5754.7	1925	66	132.0	8.1	H/2226	130.0	8.1	101.5	0.0	GC WITH SA & CB
2238	08-27-92	5756.7	1550	115	126.5	8.8	4/2238	127.0	9.0	99.6	-0.2	GC WITH SA & CB
2239	08-27-92	5758.6	1715	54	127.3	7.8	4/2239	128.1	8.5	99.4	-0.7	GC-GM W SA & CB

TEST NUMBER	DATE	ELEV	LOCATION		FIELD		STANDARD LAB COMPACTION			PERCENT COMPACTION	PERCENT +- OMC	CLASSIFICATION
			STATION	OFFSET	DRY DENS (PCF)	MC %	TEST METH	MX DRY DEN	OMC %			
2241	08-28-92	5757.4	1260	50	124.2	7.7	4/2241	127.6	8.3	97.3	-0.6	GC WITH SA & CB
2246	08-28-92	5757.1	1247	147	120.9	10.3	4/2246	124.3	9.4	97.3	0.9	GC WITH CB & SA
2250	08-29-92	5759.6	1603	77	122.7	8.4	4/2250	125.4	9.1	97.8	-0.7	GC WITH SA & CB
2253	08-29-92	5759.6	1427	72	126.9	8.4	4/2253	127.1	8.9	99.8	-0.5	GC WITH SA & CB
2254	08-30-92	5760.9	1134	72	119.6	11.3	4/2254	124.6	9.5	96.0	**1.8**	SC WITH GR & CB
2260	09-01-92	5763.9	1550	40	123.3	10.3	4/2260	123.5	9.9	99.8	0.4	GC WITH SA & CB
2263	09-02-92	5760.7	2135	35	125.9	8.6	4/2263	124.3	9.7	101.3	-1.1	GC WITH SA & CB
2268	09-02-92	5759.0	2350	142	124.2	8.2	4/2268	130.1	7.2	95.5	1.0	SC WITH GR & CB
2270	09-02-92	5769.2	1390	47	123.7	9.3	3/2270	124.5	9.4	99.4	-0.1	GC WITH SA & CB
2271	09-03-92	5765.6	1115	46	119.9	11.8	4/2271	123.6	9.7	97.0	**2.1**	GC WITH SA & CB
2274	09-03-92	5763.5	2563	56	130.9	7.7	4/2274	128.3	8.1	102.0	-0.4	GC WITH SA & CB
(1)- 2277	09-08-92	5762.5	2350	127	116.6	9.0	4/2277	122.5	10.0	95.2	-1.0	GC WITH SA & CB
2282	09-09-92	5772.0	1550	95	123.0	7.6	4/2282	123.5	9.2	99.6	-1.6	GC WITH SA & CB
(2)- 2299	09-11-92	5772.4	1800	95	122.1	7.2	4/2299	128.0	7.1	95.4	0.1	GC WITH CB & SA
2309	09-13-92	5775.7	1122	90	126.0	7.2	4/2309	122.2	9.2	103.1	-2.0	GC WITH SA & CB
2312	09-14-92	5779.2	1300	84	123.4	7.6	4/2312	122.2	9.5	101.0	-1.9	GC WITH SA & CB
2328	09-17-92	5784.8	1292	65	118.4	9.9	4/2328	121.7	10.5	97.3	-0.6	GC WITH SA & CB
2344	09-20-92	5788.8	1156	46	116.5	8.8	4/2344	121.3	10.6	96.0	-1.8	GC WITH SA & CB
2349	09-21-92	5790.0	1105	44	112.2	9.5	4/2349	119.0	10.7	**94.3**	-1.2	GC WITH SA & CB
2356	09-23-92	5793.5	2024	47	121.9	9.7	4/2356	122.4	10.1	99.6	-0.4	SC WITH GR & CB
2360	09-24-92	5794.5	1300	43	124.5	10.6	4/2360	125.3	9.3	99.4	**1.3**	GC WITH SA & CB
2369	09-25-92	5795.7	1209	37	135.3	5.2	4/2369	128.2	9.5	105.5	**-4.3**	GC WITH SA & CB
2374	09-27-92	5801.3	1880	25	125.6	10.9	4/2374	123.0	10.4	102.1	0.5	GC WITH SA & CB
2377	09-29-92	5802.5	2388	24	119.3	12.3	4/2377	119.6	11.8	99.7	0.5	SC WITH GR & CB
2387	10-02-92	5807.6	1425	21	129.8	8.7	4/2387	124.6	9.3	104.2	-0.6	GC WITH SA & CB
2393	10-07-92	5812.1	1064	12	125.5	7.5	4/2393	125.6	8.2	99.9	-0.7	GC WITH CB & SA
2396	10-09-92	5813.9	1944	3	129.6	7.2	4/2396	126.4	8.7	102.5	-1.5	GC WITH CB & SA
2398	10-10-92	5812.9	2775	6	132.8	8.1	4/2398	123.8	9.0	107.3	-0.9	GC WITH SA & CB

1 RIV Started 09/08/92 at end of day shift

2 Additional Passes initiated 09/11/92 on second shift.

QUALITY ACCEPTANCE TESTING - COMPACTION REPORT	REPORT NUMBER: RII.2	

TEST NUMBER	DATE	ELEV	LOCATION		FIELD		STANDARD LAB COMPACTION			PERCENT COMPACTION	PERCENT +- OMC	CLASSIFICATION
			STATION	OFFSET	DRY DENS (PCF)	MC %	TEST METH	MX DRY DEN	OMC %			

NOTE: Explanation of Column Headed TEST METH - 5/110 6

This indicates lab comparison type

5 - 5 point proctor
1 or 2 - 1 or 2 point proctor
H - historical proctor

All mold diameters are 12 inch unless noted here.

proctor number used for comparison to field data

IN-PLACE - TEST RANGES FOR TESTS IN EMBANKMENT FOR THIS REPORT

FIELD DRY DENSITY MIN	109.2	FIELD M.C. MIN	4.5	AVGERAGE PERCENT COMPACTION THIS REPORT	100.0
FIELD DRY DENSITY MAX	142.4	FIELD M.C. MAX	15.6	PERCENT COMPACTIONS <95% AND >93% THIS REPORT	4.9
FIELD DRY DENSITY AVG	125.8	FIELD M.C. AVG	8.7	PERCENT COMPACTIONS <93% THIS REPORT	0.9

LAB - CUMULATIVE 3,4,5 POINT PROCTOR RANGE - ALL TESTS TO 12-31-92

				AVERAGE PERCENT COMPACTION TO 12-31-92	100.0
MAX. DRY DENSITY MIN	106.6	O.M.C. MIN	6.1	PERCENT COMPACTIONS <95% AND >93% TO 12-31-92	4.9
MAX. DRY DENSITY MAX	140.1	O.M.C. MAX	17.8	PERCENT COMPACTIONS <93% TO 12-31-92	0.9
MAX. DRY DENSITY AVG	125.5	O.M.C. AVG	9.2		

COMMENT: THIS REPORT COVERS THE ENTIRE CONSTRUCTION OF THE DAM.

LAB CHIEF: ______________________

SUBMITTED BY: ______________________
PROJECT ENGINEER

PROJECT: LITTLE DELL LAKE, DAM AND APPURTENANCES RIVER: SALT LAKE CITY STREAMS STATE: UTAH TOWN: SALT LAKE CITY	CONTRACT NO. DACW05-89-C-0045 CONTRACTOR: CLEMENT BROTHERS AND J.E. STARNES CO.	DATE OF REPORT: 12-07-92 01-01-90 THRU 12-31-92

EMBANKMENT ZONE	MIN. DESIGNED % COMP	SPEC. W.C. % RANGE	LOOSE LIFT THICK. (IN)	NUMBER OF PASSES	COMPACTION EQUIPMENT
RANDOM II	95	-3 TO 1	12	5	SD150D, SD150F, SP60

TEST NUMBER	TEST IN SPEC	STATUS FAILED TESTS	TEST COMMENTS
103	Y		DENSITY AND GRAD.
110	N		PROCTOR AND GRADATION. GRADATION AS ONLY SLIGHTLY OUT OFTHE SPEC. BAND.
112	N	OLM	PROCTOR AND GRADATION. PERCENT GRAVEL IS LOW AND MOISTURE IS HIGH.
113	N	OLD,M	SLOPE MATERIAL BLENDED INTO FILL. TEST REPRESENTS AN ISOLATED AREA ADJACENT TO THE ABUTMENT. DENSITY AND GRADATION.
115	N		PROCTOR AND GRADATION. PERCENT GRAVELS IS LOW.
119	Y		BULK GRADATION SAMPLE
120	N	RW	PROCTOR AND GRADATION - LIFT REWORKED
127	N	RW,RT	PROCTOR AND DENSITY. LIFT RETESTED ON 11 MAY. SEE TESTS 129 & 130.
129	N		PROCTOR WITH DENSITY. BORDERLINE PERCENT FINES. LOW PERCENT GRAVEL.
131	N	OLD	GRADATION AND DENSITY.
132	N	RW,RT	DENSITY AND PROCTOR. LIFT REWORKED AUGUST 90. SEE TESTS NO. 374 & 375 FOR RESULTS AFTER REWORKING.
133	Y	RM	PROCTOR AND DENSITY - BORROW LOC. 1 AND 2
134	N	RM	DENSITY AND GRADATION
135	Y		DENSITY WITH BULK GRADATION
138	N	OLM	PROCTOR AND DENSITY WITH BULK SAMPLE. MOISTURE IS LOW. ISOLATED BACKFILL IN DAMP AREA OF FOUNDATION.
142	N	RW,RT	DENSITY & GRADATION. PERCENT GRAVEL IS BORDERLINE OK. MOISTURE IS HIGH. AREA REWORKED AND RETESTED.
146	Y		BULK PROCTOR AND DENSITY.
142A	N	OLD	DENSITY & GRADATION. RETEST. DENSITY BORDERLINE.
150	Y		DENSITY AND GRADATION BACKFILL AROUND SUMP.
151	Y		DENSITY AND GRADATION. BACKFILL AROUND SUMP.
153	Y		DENSITY PROCTOR BULK
154	N		DENSITY AND GRADATION. PERCENT GRAVEL IS BORDERLINE.
159	N	RW,RT	DENSITY AND PROCTOR. REWORKED AND RETESTED.
160	N	OLD,M	DENSITY AND BULK GRADATION. BORDERLINE DENSITY.
161	N		PROCTOR AND DENSITY. GRADATION SLIGHTLY OUT OF SPEC. OK.APPROXIMATELY 6% OVERSIZE.
162	Y		DENSITY AND BULK GRADATION
163	N		DENSITY AND BULK GRADATION
164	Y		DENSITY AND BULK GRADATION
170	Y		DENSITY AND BULK GRADATION
174	Y		DENSITY AND BULK GRADATION
177	N		DENSITY AND GRADATION. GRADATION IS SLIGHTLY OUT OF SPEC.OK.
178	N	OLD	DENSITY AND BULK GRADATION. DENSITY IS BORDERLINE.
180	N	OLM	DENSITY WITH PROCTOR - SPLIT SAMPLE TO SPD. GRADATION IS SLIGHTLY OUT OF SPEC BUT IS OK. MOISTURE IS BORDERLINE.
181	N		DENSITY AND BULK GRADATION. PERCENT GRAVEL IS LOW BUT PERCENT PLUS NO.4 IS HIGH. GRADATION IS OK.
188	N	OLD	DENSITY AND GRADATION. SOFTEST AREA OF SUMP BACKFILL.
196	Y		REPRESENTS MATERIAL PLACED 15 JUNE. DENSITY WITH BULK GRADATION
197	Y		REPRESENTS MATERIAL PLACED 15 JUNE. DENSITY WITH BULK GRADATION.
198	Y		SUMP BACKFILL. DENSITY WITH BULK GRADATION
199	N	RW,RT	FOUR FT. FROM LEFT ABUTMENT. DENSITY WITH BULK GRADATION.AREA REWORKED AND RETESTED. SEE TESTS 203 204 205
200	N	RW,RT	TWO FT. FROM LEFT ABUTMENT.DENSITY WITH BULK GRADATION. AREA REWORKED.
201	N	RW,RT	DENSITY WITH BULK PROCTOR. AREA REWORKED.
206	Y		DENSITY AND BULK PROCTOR
212	Y		DENSITY AND GRADATION.

TEST NUMBER	TEST IN SPEC	STATUS FAILED TESTS	TEST COMMENTS
214	Y		TOP THREE INCHES WAS WET. BULK PROCTOR AND DENSITY
215	N		APPROX. 23% PERCENT OVERSIZE. DENSITY AND GRADATION.
218	Y		DENSITY AND BULK GRADATION.
219	N		APPORXIMATELY 3 PERCENT OVERSIZE. BULK PROCTOR AND DENSITY
220	N		BULK GRADATION AND DENSITY. GRADATION SLIGHTLY OUT OF SPEC BUT IS OK.
221	N	OLM	BORDERLINE MOISTURE CONTENT OK. DENSITY AND GRADATION.
222	N		FIVE % OVERSIZE.GRADATION IS OK.BULK PROCTOR AND DENSITY.
223	Y		DENSITY AND GRADATION
224	Y		DENSITY AND GRADATION.
225	Y		BULK PROCTOR AND DENSITY. GRADATION BORDERLINE WRT % GRAVEL.
226	Y		GRADATION AND DENSITY
228	N	OLD,M	DENSITY WITH PROCTOR. MATERIAL ACCEPTED BASED ON FIELD UNIT OBSERVATIONS/JUDGEMENT.
229	Y		DENSITY WITH GRADATION.
230	N		BULK PROCTOR DENSITY. FIVE PERCENT OVERSIZE WITH SLIGHTLY LWSS THAN 30 % GRAVEL. GRADATION IS OK.
231	N	OLD	DENSITY AND GRADATION. BORDERLINE LOW DENSITY.
159A	Y		DENSITY. RETEST. GRADATION FROM TEST 159.
232	Y		BULK DENSITY PROCTOR.
235	Y		DENSITY BULK PROCTOR.
237	N	OLM	DENSITY BULK PROCTOR. REWORKED PRIOR TO TEST. GRADATION IS SLIGHTLY OUT OF SPEC BUT IS OK.
238	N		GRADATION AND DENSITY. PERCENT GRAVELS IS BORDERLINE LOW,PERCENT PLUS NO.4 IS HIGH. GRADATION IS OK.
239	N	OLM	GRADATION AND DENSITY. FIRST MATERIAL FROM CRUSHER STOCKPILE. AREA 1225 TO 1325 AND 575 TO 725 US.
240	Y		DENSITY BULK PROCTOR. MATERIAL FROM CRUSHER STOCKPILE. AREA 1225 TO 1350 AND 200 TO 425 US.
244	Y		DENSITY AND GRADATION. FROM CRUSHER STOCKPILE. AREA 1225 TO 1325 AND 575 TO 700 US.
255	N		DENSITY GRADATION. TEST LOCATED 2 FT FROM LEFT ABUTMENT.OUT OF SPEC GRADATION OK FOR ABUTMENT CONTACT AREA.
261	N		PROCTOR DENSITY. TEST LOCATION SIX FT FROM ABUTMENT. GRAVEL IS BORDERLINE BUT IS OK.
277	Y		PROCTOR GRADATION. SEE NO. 278 FOR COMPANION DENSITY. MATERIAL FROM CRUSHER STOCKPILE. FIRST OF PHASE III PLACEMENT
278	Y		DENSITY GRADATION. CRUSHER STOCKPILE MATERIAL.
279	Y		DENSITY GRADATION. MATERIAL A MIX FROM THE ADJACENT PHASE II AREA LIFTS AND THE CRUSHER STOCKPLE.
280	Y		DENSITY PROCTOR. MATERIAL FROM PHASE II AREA AND THE CRUSHER STOCKPILE.
281	Y		DENSITY AND GRADATION. MATERIAL IS A MIXTURE OF PHASE II AREA AND CRUSHER STOCKPILE MATERIAL.
282	N		PROCTOR DENSITY. MATERIAL IS A MIXTURE OF DRAIN FILL II AND MATERIAL FROM THE PHASE II AREA. GRAVEL IS BORDERLINE.
283	Y		DENSITY GRADATION. MATERIAL IS A MIXTURE OF CRUSHER STOCKPILE AND PHASE II FILL MATERIAL.
284	Y		DENSITY PROCTOR. MIXTURE OF PHASE II AREA MATERIAL AND DRAIN FILL II.
286	Y		DENSITY GRADATION. MATERIAL IS A MIXTURE OF PHASE II AND DRAINFILL II MATERIAL.
287	Y		PROCTOR DENSITY. MATERIAL IS A MIXTURE OF PHASE II AND DRAIN FILL II MATERIAL.
288	Y		TEST AREA FOR ING.RAND SPF60B ROLLER. AREA BOUNDED BY 1440 TO 1567 AND 246 TO 346 U/S.
290	Y		ING-RAND SPF60B CHECK. QC TEST 5 FEET AWAY.
294	Y		DENSITY PROCTOR. IR SPF 60B TEST AREA.
296	N		SOURCE - U/S BORROW AREA. DENSITY PROCTOR. GRADATION IS OUT OF SPEC BUT IS OK.
297	Y		SOURCE - U/S BORROW AREA. DENSITY PROCTOR.
299	Y		SOURCE - U/S BORROW AREA. DENSITY PROCTOR.
301	N		SOURCE - U/S BORROW AREA. DENSITY AND GRADATION . SEE TEST NO. 300. GRADATON IS SLIGHTLY OUT OF SPEC BUT IS OK.
305	Y		SOURCE - U/S BORROW AREA. PROCTOR & DENSITY.
306	Y		SOURCE - ROCK CRUSHER. PROCTOR & DENSITY.
307	N	RW,RT	SOURCE - ROCK CRUSHER. DENSITY & GRADATION. RETEST OF DENSITY, SEE NO. 308.
310	N		SOURCE - U/S BORROW AREA. GRADATION IS OUT OF SPEC BUT IS OK.
311	Y		SOURCE - U/S BORROW AREA. PROCTOR & DENSITY.
312	N	OLM	SOURCE - U/S BORROW AREA. PROCTOR & DENSITY.
313	Y		SOURCE - U/S BORROW AREA. PROCTOR & DENSITY.
322	Y		SOURCE - U/S BORROW AREA. PROCTOR & DENSITY.
314	N		SOURCE - U/S BORROW AREA. PROCTOR & DENSITY. PERCENT GRAVEL IS BORDERLINE LOW BUT IS OK.
315	N		SOURCE - U/S BORROW AREA. NEAR LEFT ABUTMENT. GRADATION OUT OF SPEC BUT IS OK FOR LOCATION.

TEST NUMBER	TEST IN SPEC	STATUS FAILED TESTS	TEST COMMENTS
316	Y		SOURCE - U/S BORROW AREA. DENSITY & GRADATION.
317	Y		SOURCE - ROCK CRUSHER. PROCTOR & DENSITY.
319	N	OLM	SOURCE - ROCK CRUSHER. DENSITY & PROCTOR. GRADATION IS SLIGHTLY OUT OF SPEC BUT IS OK.
320	Y		SOURCE - U/S BORROW AREA. DENSITY & PROCTOR.
321	Y		SOURCE - U/S BORROW AREA. DENSITY AND GRADATION NEAR THE ABUTMENT.
323	N	OLD	SOURCE - U/S BORROW AREA. PROCTOR & DENSITY. DENSITY LOW.LIFT ACCEPTED BASED ON FIELD UNITS OBSERVATIONS/JUDGEMENT.
326	Y		DENSITY AND GRADATION.
324A	Y		DENSITY ONLY. RETEST. GRADATION FROM 324. LIFT ACCEPTED BASED ON FIELD UNIT JUDGEMENT.
329	Y		SOURCE-RESERVOIR BORROW AREA. DENSITY & PROCTOR.
330	Y		SOURCE-RESERVOIR BORROW AREA. DENSITY & GRADATION ALONG THE ABUTMENT.
331	N		SOURCE-RESERVOIR BORROW AREA. DENSITY & PROCTOR. GRADATION IS OUT OF SPEC BUT IS OK.
334	Y		SOURCE-ROCK CRUSHER. DENSITY & PROCTOR.
335	Y		SOURCE - U/S BORROW AREA. PROCTOR & DENSITY.
336	Y		SOURCE - U/S BORROW AREA. PROCTOR & DENSITY.
337	N		SOURCE - U/S BORROW AREA. DENSITY TAKEN NEAR LEFT ABUTMENT. GRADATION IS SLIGHTLY OUT OF SPEC BUT IS OK.
339	Y		SOURCE - U/S BORROW AREA. PROCTOR & DENSITY.
340	Y		SOURCE - U/S BORROW AREA. DENSITY & GRADATION ALONG THE LEFT ABUTMENT.
341	N		SOURCE - U/S BORROW AREA AND ROCK CRUSHER MIXED. GRADATION IS SLIGHTLY OUT OF SPEC BUT IS OK.
342	N		SOURCE - U/S BORROW AREA. DENSITY & GRADATION 2 FT FROM LEFT ABUTMENT. GRADATION IS OUT OF SPEC BUT OK FOR LOCATION.
343	N		SOURCE - ROCK CRUSHER. PROCTOR & DENSITY. GRADATION IS SLIGHTLY OUT OF SPEC BUT IS OK.
344	Y		SOURCE - U/S BORROW AREA. DENSITY AND GRADATION.
345	Y		SOURCE - U/S BORROW AREA AND ROCK CRUSHER MIX. DENSITY & PROCTOR.
346	N		SOURCE-CRUSHER&RES.BORROW AREA. PROCTOR&DENS. PERCENT GRAVEL IS LOW BUT ACCEPTABLE BASED ON THE % PLUS NO.4.
347	N	RW,RT	SOURCE - U/S BORROW AREA AND ROCK CRUSHER. PROCTOR & DENSITY. MATERIAL REWORKED & RETESTED.
347A	Y		SOURCE - ROCK CRUSHER, U/S BORROW AREA, AND DF I. DF I ADDED AND LIFT REWORKED.
348	N	OLM	SOURCE-CRUSHER&U/S BORROW.PROC.&DENS.LIFT REWORKED.MATERIAL ACCEPTED BASED ON FIELD UNIT JUDGEMENT & % COMPACTION.
349	Y		SOURCE - U/S BORROW AREA. PROCTOR & DENSITY.
350	N	RW,RT	SOURCE - U/S BORROW AREA. AREA LATER HAD DFI ADDED AND LATER YET REWORKED DUE TO LOW DENSITY. PROCTOR & DENSITY
350A	N	RW,RT	SOURCE - U/S BORROW AREA AND DF-I. LIFT LATER REWORKED FROM 350 TO 420 U/S DUE TO LOW DENSITY.
351	N	RW,RT	SOURCE - U/S BORROW AREA AND ROCK CRUSHER . PROCTOR & DENSITY. LIFT REWORKED AFTER DF I ADDED.
352	Y	RM	SOURCE - U/S BORROW AREA AND ROCK CRUSHER. LIFT REMOVED TO REWORK PRIOR PLACED LIFT.
350B	Y		SOURCE - U/S BORROW AREA AND DF-I. DENSITY & GRADATION.
351A	Y		SOURCE-RESERVOIR BORROW AREA & CRUSHER. PROCTOR & DENSITY RETEST OF THE LIFT.
353	Y		SOURCE-CRUSHER & DF I. PROCTOR & DENSITY.
354	N		SOURCE-RESERVOIR BORROW AREA & DF I. PROCTOR & DENSITY. ONE PERCENT OVERSIZE, GRADATION IS OK.
355	Y		SOURCE - U/S BORROW AREA AND DF-I. PROCTOR & DENSITY.
356	Y		SOURCE - U/S BORROW AREA. PROCTOR & DENSITY.
357	Y		SOURCE - U/S BORROW AREA.
358	Y		SOURCE - ROCK CRUSHER. PROCTOR & DENSITY.
359	Y		SOURCE - ROCK CRUSHER. PROCTOR & DENSITY.
361	Y		SOURCE-RESERVOIR BORROW AREA & DF I. PROCTOR & DENSITY.LIFT COMPACTED WITH SPF 60 NOT FULLY FUNCTIONAL.
362	N	OLD	SOURCE-RES. BOR. AREA & DFI. PROCTOR&DENSITY. SPF 60 NOT FULLY FUNCTIONAL. DENSITY IS LOW.
363	Y		SOURCE-ROCK CRUSHER. PROCTOR & DENSITY.LIFT COMPACTED WITH SPF 60 NOT FULLY FUNCTIONAL.
364	Y		SOURCE - U/S BORROW AREA. PROCTOR & DENSITY.
365	N		SOURCE - U/S BORROW AREA. DENSITY & GRADATION. GRADATION IS OUT OF SPEC BUT IS OK.
366	Y		SOURCE - U/S BORROW AREA. DENSITY & GRADATION.
367	Y		SOURCE-RESERVOIR BORROW AREA. PROCTOR & DENSITY.
369	Y		SOURCE-RESERVOIR BORROW AREA. PROCTOR & DENSITY.
374	N	OLD	SOURCE-RES.BORROW AREA. DENS.&GRAD. RAVINE. DENSITY IS BORDERLINE. THIS IS A RETEST FOR TEST NO.132.
375	N		SOURCE-RES. BORROW AREA. DENS. & GRAD. RAVINE. % GRAVEL IS LOW. MC IS BORDERLINE. RETEST FOR TEST NO.132.
376	N		SOURCE-RESERVOIR BORROW AREA. PROCTOR & DENSITY. TWO PERCENT OVERSIZE. GRADATION IS OUT OF SPEC BUT OK.
378	N		SOURCE-RESERVOIR BORROW AREA. PROCTOR & DENSITY. TWO PERCENT OVERSIZE. GRADATION IS OUT OF SPEC BUT OK.

TEST NUMBER	TEST IN SPEC	STATUS FAILED TESTS	TEST COMMENTS
379	Y		SOURCE-NOT RECORDED. DENSITY & GRADATION. NEAR LEFT ABUTMENT.
380	Y		SOURCE-NOT RECORDED. DENSITY & GRADATION. NEAR RIGHT ABUTMENT.
381	Y		SOURCE-NOT RECORDED. DENSITY & PROCTOR.
385	N	RW,RT	SOURCE-RESERVOIR BORROW AREA.PROCTOR & DENSITY. MOISTUREIS OUT OF SPEC,MATERIAL WAS REWORKED.
385A	Y		SOURCE-RESERVOIR BORROW AREA. DENSITY ONLY. GRADATION FROM 385.
386	Y		SOURCE-NOT RECORDED. PROCTOR & DENSITY.
387A	Y		SOURCE-NOT RECORDED. DENSITY & GRADATION.
388	N	OLD	SOURCE-CRUSHER STOCKPILE. PROCTOR & DENSITY. DENSITY IS BORDERLINE LOW. COMPUTER ROUND OFF TO 95 %.
389	Y		SOURCE-CRUSHER STOCKPILE. PROCTOR & DENSITY.
390	Y		SOURCE-NOT RECORDED. DENSITY & GRADATION. TEST NEAR THE LEFT ABUTMENT.
391	Y		SOURCE-NOT RECORDED. DENSITY & GRADATION.TEST NEAR RIGHT ABUTMENT.
393	Y		SOURCE-RESERVOIR BORROW AREA. PROCTOR & DENSITY.
396	N	OLM	SOURCE-RESERVOIR BORROW AREA. PROCTOR & DENSITY. MOISTURE IS SLIGHTLY OUT OF SPEC. ACCEPTABLE BASED ON DENSITY.
397	N	OLM	PROC.&DENS. GRADATION IS OUT OF SPEC BUT IS OK. MC IS HIGH. MATERIAL ACCEPTED BASED ON FIELD UNIT JUDGEMENT&DENSITY.
398	Y		SOURCE-RESERVOIR BORROW AREA. DENSITY & GRADATION. TEST NEAR LEFT ABUTMENT.
401	Y		SOURCE-CRUSHER. DENSITY & GRADATION. GRADATION IS OUT OF SPEC BUT IS OK.
403	Y		SOURCE-CRUSHER. PROCTOR & DENSITY.
405	Y		SOURCE-CRUSHER. PROCTOR & DENSITY.
407	Y		SOURCE-RESERVOIR BORROW AREAS. PROCTOR & DENSITY.
408	Y		SOURCE-RESERVOIR BORROW AREA. DENSITY & GRADATION.
409	Y		SOURCE-RESERVOIR BORROW AREA. PROCTOR & DENSITY
410	Y		SOURCE-CRUSHER. DENSITY & GRADATION.
411	Y		SOURCE-CRUSHER. PROCTOR & DENSITY.
412	N	OLM	SOURCE - U/S BORROW AREA. MOISTURE IS SLIGHTLY HIGH. MATERIAL ACCEPTED BASED ON FIELD UNIT JUDGEMENT AND DENSITY.
413	Y		SOURCE - ROCK CRUSHER. DENSITY & GRADATION. RAVINE.
415	N		SOURCE - ROCK CRUSHER. PROCTOR & DENSITY. GRADATION IS OUT OF SPEC BUT IS OK.
416	N		SOURCE - U/S BORROW AREA. PROCTOR & DENSITY. GRADATION IS OUT OF SPEC BUT IS OK. 5% OVERSIZE.
419	Y		SOURCE - U/S BORROW AREA. DENSITY & GRADATION.
420	Y		SOURCE - U/S BORROW AREA. DENSITY & GRADATION.
421	Y		SOURCE - ROCK CRUSHER. PROCTOR & DENSITY.
422	Y		SOURCE - ROCK CRUSHER. PROCTOR & DENSITY.
423	Y		SOURCE - U/S BORROW AREA. PROCTOR & DENSITY.
424	N		SOURCE -ROCK CRUSHER. DENSITY & GRADATION. GRADATION IS OUT OF SPEC BUT IS OK.
425	N	OLM	SOURCE - ROCK CRUSHER. PROCTOR & DENSITY. MOISTURE IS SLIGHTLY OUT OF SPEC. MATERIAL ACCEPTED BASED ON DENSITY.
426	N	OLD	SOURCE-CRUSHER&RES.BOR.AREA. PROCTOR&DENS. DENSITY IS LOW.MATERIAL ACCEPTED BASED ON FIELD UNIT JUDGEMENT.
427	N	OLD	SOURCE-RES.BOR.AREA. DENSITY&GRADATION. DENSITY IS LOW. MATERIAL ACCEPTED BASED ON FIELD UNIT JUDGEMENT. ABUTMENT.
428	Y		SOURCE - ROCK CRUSHER. DENSITY & GRADATION.
429	Y		SOURCE - U/S BORROW AREA. PROCTOR & GRADATION.
430	Y		SOURCE - U/S BORROW AREA. PROCTOR & DENSITY
431	N	OLM	SOURCE-CRUSHER. PROCTOR&DENSITY. MATERIAL ACCEPTED BASED ON FIELD UNIT JUDGEMENT/OBSERVATIONS & DENSITY
432	Y		SOURCE -CRUSHER PLANT. DENSITY & GRADATION.
433	Y		SOURCE-CRUSHER PLANT. DENSITY & GRADATION.
437	Y		SOURCE-CRUSHER PLANT. PROCTOR & DENSITY.
438	Y		SOURCE-CRUSHER PLANT. DENSITY & GRADATION.
439	Y		SOURCE-CRUSHER&RES.BOR.AREA MIX. PROCTOR & DENSITY.
445	N		SOURCE-CRUSHER. PROCTOR & DENSITY. GRADATION IS SLIGHTLY OF SPEC BUT IS OK.
448	Y		SOURCE-CRUSHER&RES.BORROW AREA MIX. PROCTOR & DENSITY.
451	Y		SOURCE-CRUSHER. PROCTOR & DENSITY.
458	Y		SOURCE-RES.BORROW AREA. DENSITY & GRADATION.
459	N		SOURCE-CRUSHER&RES.BORROW AREA. DENSITY AND GRADATION. DENSITY FOR TEST NO.455. GRADATION IS OUT OF SPEC BUT IS OK.
460	Y		SOURCE-CRUSHER&RES.BORROW AREA. PROCTOR & DENSITY.
462	Y		SOURCE-CRUSHER&RES.BORROW AREA. PROCTOR & DENSITY.

TEST NUMBER	TEST IN SPEC	STATUS FAILED TESTS	TEST COMMENTS
464	N		SOURCE-CRUSHER . DENSITY & GRADATION. GRADATION IS SLIGHTLY OUT OF SPEC BUT IS OK.
465	Y		SOURCE-RES.BORROW AREA & CRUSHER MIX. PROCTOR & DENSITY.
479	Y		SOURCE-RES.BORROW AREA & CRUSHER. DENSITY & GRADATION.
482	N		SOURCE-RES.BORROW AREA & CRUSHER MIX. PROCTOR & DENSITY.GRADATION IS SLIGHTLY OUT OF SPEC BUT IS OK.
484	Y		SOURCE-RES.BORROW AREA & CRUSHER MIX. PROCTOR & DENSITY.
486	N		SOURCE-RES.BORROW AREA & CRUSHER. PROCTOR & DENSITY. GRADATION IS SLIGHTLY OUT OF SPEC BUT IS OK.
489	Y		SOURCE-RES.BORROW AREA & CRUSHER. PROCTOR & DENSITY.
493	Y		SOURCE-RES.BORROW AREA. PROCTOR & DENSITY.
499	Y		SOURCE-RES.BORROW AREA. DENSITY & GRADATION.
500	N		SOURCE-RES.BORROW AREA & CRUSHER MIX. PROCTOR & DENSITY.GRADATION IS SLIGHTLY OUT OF SPEC. BUT IS OK.
503	Y		SOURCE-CRUSHER. PROCTOR & DENSITY.
506	Y		SOURCE-CRUSHER. PROCTOR & DENSITY
520	N	RW,RT	SOURCE-RES.BOR.AREA & CRUSHER.PROCTOR & DENSITY.PERCENT GRAVEL IS LOW. MATERIAL REWORKED TO DISTRIBUTE THE GRAVEL.
528	Y		SOURCE-CRUSHER. PROCTOR & DENSITY. RETEST OF 520.
544	Y		SOURCE-RES.BORROW AREA & CRUSHER MIX. DENSITY & GRADATION
571	N		SOURCE-CRUSHER. DENSITY & GRADATION. GRADATION IS SLIGHTLY OUT OF SPEC BUT IS OK.
576	Y		SOURCE-CRUSHER. DENSITY & GRADATION.
592	N	RW,RT	SOURCE-RES.BOR.AREA. PROCTOR & DENSITY.
598	Y		SOURCE-CRUSHER. DENSITY & GRADATION. NOTCH BACKFILL AT HAUL ROAD CROSSING.
592A	Y		SOURCE-RES.BOR.AREA. DENSITY & GRADATION. RETEST OF 592.
586	Y		SOURCE-CRUSHER. PROCTOR & DENSITY.
946	N	OLD	SOURCE-REMAINING RII STOCKPILE. DENS.GRAD.PROCTOR.
959	Y		SOURCE-EXISTING COFFERDAM. DENS.GRAD.PROCTOR. SPF60
973	Y		SOURCE-UPPER GRAVEL,OLD ALLUVIUM NEAR LITTLE KOLMAN.DENS.GRAD.PROCTOR. SPF60.
982	Y		SOURCE-OLD ALLUVIUM,BIG KOLMAN STOCKPILE.DENS.GRAD.PROCTOR SPF60
999	N	RM	SOURCE-SECTION 5 & 6 RIGHT,ABOVE LITTLE KOLMAN. DENS.GRAD.SPF60. LIFT REMOVED.
1006	Y		SOURCE-BIG KOLMAN STOCKPILE. DENS.GRAD.PROCTOR. SPF60.
1010	Y		SOURCE-BIG KOLMAN STOCKPILE. DENS.GRAD.PROCTOR. SPF60.
1023	Y		SOURCE-BIG KOLMAN STOCKPILE. DENS.GRAD.PROCTOR. SPF60.
1028	Y		SOURCE-BIG KOLMAN STOCKPILE. DENS.GRAD.PROCTOR. SPF60.
1038	N	OLM	SOURCE-BIG KOLMAN STOCKPILE. DENS.GRAD.PROCTOR. SPF60.
1049	Y		SOURCE-BIG KOLMAN STOCKPILE. DENS.GRAD.PROCTOR. SPF60.
1060	Y		SOURCE-BIG KOLMAN STOCKPILE. DENS.GRAD.PROCTOR. SPF60.
1067	Y		SOURCE-BIG KOLMAN STOCKPILE. DENS.GRAD. SPF60.
1077	N	OLM	SOURCE-BIG KOLMAN STOCKPILE. DENS.GRAD.PROCTOR. SPF60.NEAR LEFT ABUTMENT,APPROX. 4FT. AWAY.
1084	Y		SOURCE-BIG KOLMAN STOCKPILE. DENS.GRAD. SPF60.
1087	Y		SOURCE-BIG KOLMAN STOCKPILE. DENS.GRAD.PROCTOR. SPF60.
1099	N		SOURCE-VARIABLE,RI SHOP STOCKPILE MATERIAL RUN THROUGH THE LITTLE KOLMAN.DENS.GRAD. SPF60.
1111	Y		SOURCE-NOT STATED. DENS.GRAD. SPF60.
1120	N		SOURCE-LITTLE KOLMAN. DENS.GRAD. SPF60.
1129	Y		SOURCE-NOT STATED. DENS.GRAD.PROCTOR. SPF60
1140	N		SOURCE-NOT STATED. DENS.GRAD. SPF60.
1150	Y		SOURCE-BIG KOLMAN STOCKPILE. DENS.GRAD.PROCTOR. SPF60.
1152	N	OLM	SOURCE-NOT STATED. DENS.GRAD. SPF60. GRADATION MATCH.
1154	N		SOURCE-NOT STATED. DENS.GRAD.PROCTOR. SPF60.
1188	N		SOURCE-NOT SPECIFIC. DENS.GRAD. SPF60.
1235	Y		SOURCE-NOT STATED. DENS.GRAD.PROCTOR.
1243	N	OLM	SOURCE- . DENS.GRAD. SPF 60. NEAR LEFT ABUTMENT.APPROX.4FTAWAY.TEST REPRESENTS LIFT 50 TO 200 FT U/S. GRAD.MATCH.
1250	Y		SOURCE-BIG KOLMAN STOCKPILE MIX. DENS.GRAD.PROCTOR.SPF 60, 6 TO 8 PASSES.
1252	N		SOURCE-BIG KOLMAN MIX. DENS.GRAD. SPF60.
1256	Y		SOURCE-NOT STATED. DENS.GRAD.PROCTOR. SEE 1256A FOR FIELD DENSITY.
1259	Y		SOURCE-BIG KOLMAN MIX. DENS.GRAD. SPF60.

TEST NUMBER	TEST IN SPEC	STATUS FAILED TESTS	TEST COMMENTS
1262	N	RM	SOURCE-NOT STATED. DENS.GRAD.PROCTOR. LIFT RETESTED AFTER ADDING GRAVEL, SEE 1275.
1275	Y		SOURCE-NOT STATED. DENS.GRAD. SEE TEST 1262. RETEST AFTER GRAVEL ADDED AND LIFT REWORKED.
1314	N	OLM	SOURCE-BURDETTE HAUL ROAD & COFFERDAM & KOLMAN MIX.DENS.GRAD.PROCTOR. SPF60.
1318	N		SOURCE-NOT STATED,MAYBE A MIX. DENS.GRAD. 2PT PROCTOR MATCH TO FAMILY OF CURVES. SPF60.
1324	Y		SOURCE-SMALL KOLMAN & CRUSHER BLEND. DENS.GRAD.PROCTOR.SPF60.
1330	Y		SOURCE-BIG KOLMAN & CRUSHER BLEND. DENS.GRAD.
1334	N	RW,RT	SOURCE-NOT STATED. DENS.GRAD. MATERIAL REWORKED, GRAVEL ADDED. SEE RETEST 1334A.
1338	Y		SOURCE-CRUSHER STOCKPILE. DENS.GRAD.
1334A	Y		SOURCE-NOT STATED. DENS.GRAD.PROCTOR. DFI ADDED. RETEST OF 1334.
1350	Y	RW,RT	SOURCE-BIG KOLMAN & CRUSHER BLEND. DENS.GRAD. AREA REROLLED AND RETESTED AFTER 5 PASSES ADDED. SEE 1350A.
1350A	Y		SOURCE-SAME. FIELD DENSITY ONLY, AFTER ADDING 5 PASSES.OTHER DATA FROM TEST 1350.
1358	N	RW,RT	SOURCE-NOT STATED. DENS.GRAD.PROCTOR. GRAVEL ADDED, LIFT REWORKED.SEE 1358A.
1358A	N	OLD	SOURCE-NOT STATED. DENS.GRAD.PROCTOR. RETEST OF 1358 AFTER GRAVEL ADDED.
1360A	Y		SOURCE-NOT STATED. DENS.GRAD.PROCTOR. RETEST AFTER GRAVEL ADDED AND AREA REWORKED.
1368	N	RW,RT	SOURCE-SECTION 6. DENS.GRAD.PROCTOR. ADDITIONAL PASSES ADDED AND FIELD DENSITY RETESTED. SEE 1368A.
1368A	Y		SOURCE-SAME. DENSITY ONLY. OTHER TEST DATA FROM 1368.
1372	Y		SOURCE-SECTION 7. DENS.GRAD. SPF60.
1376	Y		SOURCE-SECTION 6. DENS.GRAD.PROCTOR. SPF60.
1391	N	OLD,M	SOURCE-SECTION 6 & BIG KOLMAN MIX. DENS.GRAD. 2PT PROCTOR,MATCH TO FAMILY OF CURVES.
1396	N	RW,RT	SOURCE-NOT STATED. DENS.GRAD.PROCTOR. GRAVEL ADDED,AREA REWORKED,RETESTED. SEE 1396A.
1401	Y		SOURCE-NOT STATED. DENS.GRAD. FIELD DENSITY&MC ARE AVERAGE OF TEST 1401 & 1401A. 120.3/11.2 & 121.0/10.0.
1396A	Y		SOURCE-NOT STATED. DENS.GRAD.PROCTOR. SPF60.MATERIAL ADDED FROM SLC COUNTY PIT. RETEST OF 1396 AFTER REWORKING.
1407	N		SOURCE-NOT STATED..DENS.GRAD.PROCTOR.FIELD DENSITY&MC ARE AVER. OF 1407&1407A. 116.6/9.6 & 115.2/11.2
1414	Y		SOURCE-SECTION 6 & 7. DENS.GRAD.
1419	N	OLD	SOURCE-SECTION 6&7 AND SLC PIT. DENS.GRAD.PROCTOR. SPF60.
1428	Y		SOURCE-SECTION 6 & CRUSHER. DENS.GRAD. SPF60&IR150F.ROCK CRUSHER MATERIAL ADDED.
1452	N	OLM	SOURCE-SECTION 6. DENS.GRAD.PROCTOR. SPF60 & IR150F&D.
1456	Y		SOURCE-SECTION 6. DENS.GRAD. SPF60 & IR150F,D.
1462	Y		SOURCE-SECTION 6&7. DENS.GRAD.PROCTOR. SPF60&IR150D&F.
1464	N		SOURCE-STA.40,100LFT,UPPER GRVL. DENS.GRAD. SPF60,IR150D&F.
1467	N	OLM	SOURCE-BIG KOLMAN. DENS.GRAD. SPF60,IR150D&F.
1470	Y		SOURCE-NOT SPECIFIC,BIG KOLMAN. DENS.GRAD.PROCTOR. SPF60&IR150D&F.
1472	Y		SOURCE-BIG KOLMAN. DENS.GRAD. SPF60 & IR150D&F.
1483	Y		SOURCE-NOT STATED. DENS.GRAD.PROCTOR. SPF60 & IR150D&F.
1491	Y		SOURCE-BIG KOLMAN,NOT SPECIFIC. DENS.GRAD. SPF60&IR150F&D.2PT PROCTOR MATCH TO FAMILY OF CURVES.
1493	Y		SOURCE-BIG KOLMAN & CRUSHER. DENS.GRAD.PROCTOR. SPF60 & IR150D&F.
1499	Y		SOURCE-NOT SPECIFIC,BIG KOLMAN & SLC PIT. DENS.GRAD.SPF60& IR150F&D. 8 COVERAGES.
1513	N		SOURCE- NA. DENS.GRAD. SPF60. FIRST QA TEST OF THE SEASON. MATERIAL REWORKED. AREA 345 TO COFFERDAM,1750 TO LA.
1552	N		SOURCE-NA. DENS.GRAD.PROCTOR. SPF60. AREA 1350 TO 1750 ,240 TO 300. SPRING START UP RESTORATION. LOW % GRAVEL.
1565	N	RW,RT	SOURCE-RBA 5000,150RT. DENS.GRAD.PROCTOR. SPF60 W/6PASS.AREA 1350 TO 1560,100 TO 200. AREA REWORKED&RETESTED.
1567	N	RW,RT	SOURCE-NOT SPECIFIED,KOLMAN RUN. GRADATION ONLY. AREA 1600 TO 1950,150 TO 230. MATERIAL ADDED THEN REWORKED&RETEST.
1565A	N		SOURCE-NOT SPECIFIC. DENSITY ONLY. GRAD. FROM 1565. AREA REWORKED&RETESTED FOR DENSITY&MOISTURE ONLY.
1574	N	OLD	SOURCE-NOT SPECIFIC,PIT RUN. DENS.GRAD.PROCTOR. AREA 1700 TO LA,380 TO COFFERDAM.
1567A	N		SOURCE-NOT SPECIFIC,KOLMAN RUN. DENS.GRAD.PROCTOR. AREA 1650 TO 2000 ,150 TO COFFERDAM. MAT.ADDED REWORKED & FAILED.
1585	N		SOURCE-NOT STATED. DENS.GRAD.PROCTOR. AREA 1600 TO RA,20 TO COFFERDAM.
1602	Y		SOURCE-RBA 4400,RIGHT.KOLMAN RUN & COFFERDAM MIX. DENS.GRAD.PROCTOR. AREA RA TO 1650,75 TO 140.
1609	N	RW,RT	SOURCE-RBA KOLMAN RUN & CRUSHER MIX. DENS.GRAD.PROCTOR.AREA 1650 TO RA,150 TO COFFERDAM. SALTED. SEE TEST 1618.
1618	Y		SOURCE-MIXED. DENS.GRAD.PROCTOR. REWORK,RETEST OF 1609.AREA 1750 TO RA,220 TO COFFERDAM. LIFT PLACED 4/17/92.
1629	N		SOURCE-RBA RECENT ALLUVIUM,STA 5300. DENS.GRAD.PROCTOR.AREA RA TO 1650,30 TO 150. LIFT PLACED 4/17/92.
1643	Y		SOURCE-RBA 7600,800 LFT. DENS.GRAD.PROCTOR. AREA LA TO 1800,240 TO 300.
1644	Y		SOURCE-RBA YA. DENS GRAD.PROCTOR. AREA LA TO 1775,240 TO COFFERDAM.
1656	Y		SOURCE-RBA,YA. DENS.GRAD.PROCTOR. AREA LA TO 1800,105 TO 250.

TEST NUMBER	TEST IN SPEC	STATUS FAILED TESTS	TEST COMMENTS
1662	Y		SOURCE-RBA 6000 TO 6200,RT.YA. DENS.GRAD.PROCTOR. AREA 140 TO 240.
1671	Y		SOURCE-UNKNOWN,COFFERDAM MIX. DENS.GRAD.PROCTOR.
1677	Y		SOURCE-RBA NOT SPECIFIC. DENS.GRAD.PROCTOR. AREA 1550 TO 1800,200 TO 300.
1679	N	OLM	SOURCE-RBA 5600,RT. DENS.GRAD.PROCTOR. AREA 1300 TO 1800,240 TO COFFERDAM.
1681	Y		SOURCE-RBA 5500,800 RT. DENS.GRAD.PROCTOR. AREA LA TO 1850, 240 TO COFFERDAM.
1685	Y		SOURCE-RBA NOT SPECIFIC. DENS.GRAD.PROCTOR. AREA LA TO RA,240 TO 340.
1689	N	OLM	SOURCE-MIX OF KOLMAN,COFFER DAM,PIT RUN. DENS.GRAD.PROCTOR. AREA LA TO 2100,190 TO COFFERDAM.
1691	N		SOURCE-RBA NOT SPECIFIC. DENS.GRAD.PROCTOR. AREA 1500 TO 1950,100 TO 240.
1697	N		SOURCE-RBA NOT SPECIFIC. DENS.GRAD.PROCTOR. AREA 1800 TO 2150,120 TO 240.
1698	N		SOURCE-RBA & COFFERDAM. DENS.GRAD.PROCTOR. AREA LA TO RA,IC TO 110. PROCTOR LOCATION 100 FT FROM SANDCONE.
1704	Y		SOURCE-RBA NOT SPECIFIC. DENS.GRAD.PROCTOR. AREA 1800 TO 2200,180 TO 240.
1713	Y		SOURCE-RBA NOT SPECIFIC. DENS.GRAD.PROCTOR. AREA LA TO 1800,110 TO 240. SEE ALSO 1713A.
1714	N	RW,RT	SOURCE-RBA 4600 TO 5000. GRADATION ONLY. AREA LA TO 1750,240 TO U/S EDGE. % GRAVEL LOW, AREA SEEDED, REWORKED.
1714A	N		SOURCE-RBA SEEDED. DENS.GRAD.PROCTOR. AREA LA TO 1700,240 TO U/S EDGE. % GRAVEL STILL LOW.
1719	Y	RW,RT	SOURCE-RBA KOLMAN. DENS.GRAD.PROCTOR. AREA 2150 TO RA,IC TO COFFERDAM. SEE REWORK,RETEST 1719A.
1722	N		SOURCE-RBA KOLMAN. DENS.GRAD.PROCTOR. AREA LA TO 1800,IC TO 240.
1719A	Y		SOURCE-RBA SAME AS 1719. DENSITY ONLY. RETEST OF AREA AFTER REWORKING. GRADATION AND PROCTOR FROM 1719.
1733	N	OLD,M	SOURCE-RBA 5800,FAR RT. DENS.GRAD.PROCTOR.
1735	N		SOURCE-RBA KOLMAN. DENS.GRAD.PROCTOR. AREA LA TO 1550,260 TO EDGE OF DAM.
1739	Y		SOURCE-RBA 5500 TO KOLMAN. DENS.GRAD.PROCTOR. AREA 1400 TO 2100,IC TO 100.
1740	Y		SOURCE-RBA 3200 TO 3800,BASAL GR. DENS.GRAD.PROCTOR. AREA NOT SPECIFIC.
1743	N		SOURCE-RBA 4000,UP GR & COFFERDAM. DENS.GRAD.PROCTOR.AREA LA TO 1800,140 TO 235.
1748	N		SOURCE-RBA KOLMAN COFFERDAM BORROW MIX. DENS.GRAD.PROC. AREA LA TO 2150,IC TO 100.
1749	Y		SOURCE-RBA KOLMAN ADDITIONAL GRVL MIX. DENS.GRAD.PROC. AREA LA TO MHR, 110 TO 240.
1758	N		SOURCE-RBA KOLMAN MIX. DENS.GRAD.PROC. AREA LA TO MHR,110 TO 240.
1763	N	RW,RT	SOURCE-RBA BASAL GRAVEL. DENS.GRAD.PROC. AREA LA TO 192, 240 TO U/S EDGE. REWORKED RETESTED.
1765	N		SOURCE-RBA KOLMAN YOUNG ALLUVIUM MIX. DENS.GRAD.PROC. AREA LA TO 1925,110 TO 240.
1769	Y		SOURCE-RBA 6000, YA. DENS.GRAD.PROC. AREA LA TO 1925, IC TO 100.
1771	N	RW,RT	SOURCE-RBA YA & KOLMAN MIX. DENS.GRAD.PROC. AREA LA TO 1925, 120 TO 230.
1763A	N		SOURCE-RBA. DENSITY ONLY. RETEST OF 1763. GRADATION FROM 1763.CONTRACTOR ELECTED TO REWORK ON HIS OWN.
1775	Y		SOURCE-RBA. DENS.GRAD.PROC. AREA 1925 TO RA, IC TO 120.
1777	N		SOURCE-RBA 6100 FAR RIGHT. DENS.GRAD.PROC. AREA RA TO 1925, IC TO EDGE OF DAM.
1771A	N		SOURCE-RBA. DENSITY ONLY. RETEST OF 1771. GRADATION FROM 1771. QC AND QA THOUGHT IT WAS TOO WET.
1781	Y		SOURCE-RBA 5500,300 RT. & KOLMAN MIX. DENS.GRAD.PROC. AREA 1875 TO RA,IC TO 220.
1785	Y		SOURCE-RBA. DENS.GRAD.PROC. AREA LA TO 1925,240 TO EDGE.
1789	Y		SOURCE-RBA. DENS.GRAD.PROCTOR. AREA 1925 TO RA,140 TO 240.
1790	N		SOURCE-RBA KOLMAN MIX. DENS.GRAD.PROC. AREA 1975 TO RA,IC TO 120.
1795	N	OLD	SOURCE-RBA. DENS.GRAD.PROC. AREA 1800 TO 2200,220 TO EDGE. FIRST SAND CONE 120.2 AT 11.4. NEAR HAUL ROAD.
1800	N	OLM	SOURCE-RBA KOLMAN. DENS.GRAD.PROC. AREA LA TO 2000,IC TO 200.
1802	Y		SOURCE-RBA 3200 TO 3400. DENS.GRAD.PROC. AREA 2000 TO RA,IC TO 220.
1808	Y		SOURCE-RBA 5000 TO 6000,KOLMAN. DENS.GRAD.PROC. AREA 2075 TO RA, IC TO 240.
1812	Y		SOURCE-RBA. DENS.GRAD.PROC. AREA LA TO 2250,230 TO EDGE.
1813	N		SOURCE-RBA NOT SPECIFIC. DENS.GRAD.PROC. AREA 2050 TO RA,IC TO 240.
1816	N		SOURCE-RBA 6300,400 RT & 6100 200 RT. DENS.GRAD.PROC. AREA 2050 TO 2400,IC TO 240.
1823	N	OLM	SOURCE-RBA. DENS.GRAD.PROC. AREA LA TO 2050, 200 TO EDGE.
1824	N		SOURCE-RBA 5800. DENS.GRAD.PROC. AREA LA TO 2050,IC TO 200.
1835	Y		SOURCE-RBA 5900,100 RT. DENS.GRAD.PROC. AREA 1450 TO 2150,200 TO 280.
1841	N	OLM	SOURCE-RBA. DENS.GRAD.PROC. AREA LA TO 2050,250 TO 375.
1842	N		SOURCE-RBA 5800. DENS.GRAD.PROC. AREA LA TO 2150,IC TO 150.
1844	N	OLM	SOURCE-RBA. DENS.GRAD.PROC. AREA 1400 TO 2050,160 TO 260.
1849	N	RW,RT	SOURCE-RBA. DENS.GRAD.PROC. AREA 1260 TO 1800,33 TO 110.AREA REWORKED RETESTED, SEE 1849A.
1851	Y		SOURCE-RBA. DENS.GRAD.PROC. AREA LA TO 2250,150 TO 230.

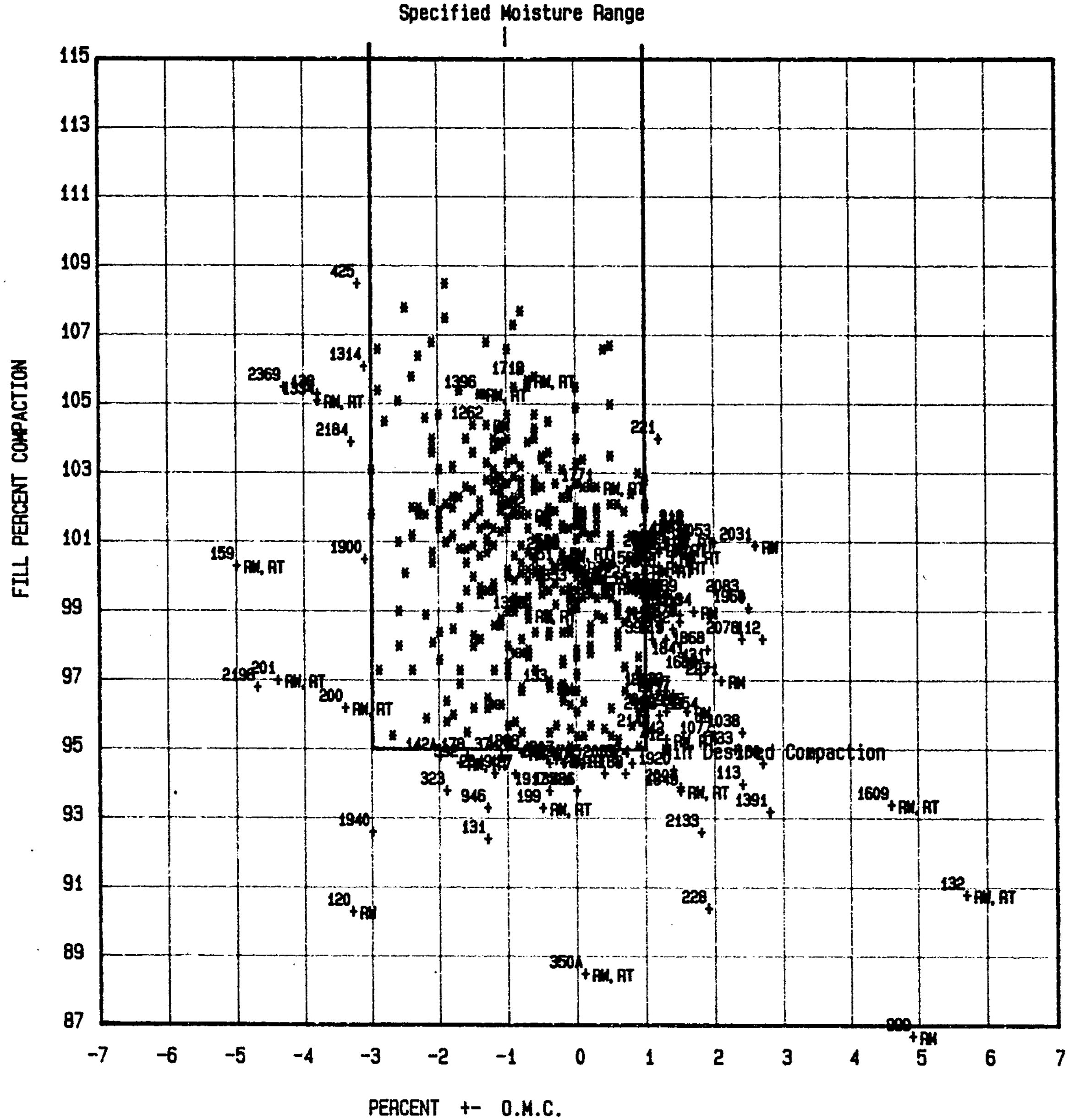
TEST NUMBER	TEST IN SPEC	STATUS FAILED TESTS	TEST COMMENTS
1849A	Y		SOURCE-RBA. DENS.GRAD.PROC. AREA 1400 TO 1800,33 TO 200.
1853	N	RW,RT	SOURCE-RBA. DENS.GRAD.PROC. AREA 1225 TO 2050,240 TO 360.AREA THOUGHT TO BE WET,REWORKED AND RETESTED. SEE 1853A.
1853A	N		SOURCE-RBA. DENSITY ONLY. RETEST OF 1853. GRADATION AND PROCTOR FROM 1853.SAME AREA AFTER REWORKING.
1861	Y		SOURCE-RBA. DENS.GRAD.PROC. AREA 1700 TO 2200,240 TO 360.
1865	Y		SOURCE-RBA. DENS.GRAD.PROC. AREA 1200 TO 1800,75 TO 200.
1868	N	OLM	SOURCE-RBA. DENS.GRAD.PROC. AREA 1700 TO 2200,200 TO 280.
1870	Y		SOURCE-RBA EXTENDED AREA. DENS.GRAD.PROC. AREA 1250 TO 1700,32 TO 130.
1878	N		SOURCE-RBA. DENS.GRAD.PROC. AREA 1250 TO 1800,240 TO 355.
1880	Y		SOURCE-RBA EXTENDED AREA. DENS.GRAD.PROC. AREA LA TO 2300,130 TO 200.
1886	Y		SOURCE-RBA KOLMAN & EXTENDED MIX. DENS.GRAD.PROC. AREA A800 TO 2250,100 TO 180.
1890	N		SOURCE-RBA 5600 . DENS.GRAD.PROC. AREA LA 2300,200 TO 350.
1895	N		SOURCE-RBA EXTENDED AREA. DENS.GRAD.PROC. AREA LA TO 2350,IC TO 176.
1897	Y		SOURCE-RBA, KOLMAN . DENS.GRAD.PROC. AREA LA TO 2350,178 TO EDGE.
1898	Y		SOURCE-RBA EXTENDED AREA. DENS.GRAD PROC. AREA 1650 TO 1950,32 TO 100.
1900	N	OLM	SOURCE-RBA EXTENDED AREA. DENS.GRAD.PROC. AREA LA TO 2150,IC TO 178.
1901	N		SOURCE-RBA 3800 & 6300,150 RT. DENS.GRAD.PROC. AREA LA TO 2150,178 TO EDGE.
1908	N	OLM	SOURCE-RBA EXTENDED AREA. DENS.GRAD.PROC. AREA LA TO 2150,IC TO 100. OUT OF SPEC FINES & GRAVEL.
1910	N		SOURCE-RBA. DENS.GRAD.PROC. AREA LA TO 2305,240 TO 330.
1917	N	OLD	SOURCE-RBA KOLMAN & DIRECT HAUL. DENS.GRAD.PROC. AREA LA TO 2150,178 TO 250.
1920	N	OLD,M	SOURCE-RBA EXTENDED AREA. DENS.GRAD.PROC. AREA 2150 TO RA,IC TO 178.
1923	N		SOURCE-RBA 3500 BASAL GR. DENS.GRAD.PROC. AREA LA TO 2150,230 TO EDGE.
1933	Y		SOURCE-RBA EXTENEDED AREA. DENS.GRAD.PROC. AREA LA TO 2150,IC TO 90.
1935	N		SOURCE-KOLMAN & 5700 ON CL. DENS.GRAD.PROC. AREA LA TO 2200,235 TO 330.
1940	N	OLD	SOURCE-RBA KOLMAN & 5700,100 RT MIX. DENS.GRAD.PROC. AREA LA TO 2250,280 TO 330 & 1700 TO 2150,170 TO 260.
1941	N		SOURCE-RBA EXTENDED AREA. DENS.GRAD.PROC. AREA RA TO 2165,30 TO 170.
1942	N		SOURCE-RBA KOCAL 5600,200 LFT & DIRECT HAUL.DENS.GRAD.PROC. AREA NOT STATED.
1946A	Y		SOURCE-RBA KOLMAN & COFFERDAM MIX. DENS.GRAD.PROC. AREA NOT STATED.
1953	N		SOURCE-RBA KOLMAN MIX. DENS.GRAD.PROC. AREA NOT STATED.
1956	Y		SOURCE-RBA EXTENDED AREA. DENS.GRAD.PROC. AREA NOT STATED.
1960	N	OLM	SOURCE-RBA KOCAL & DIRECT MIX. DENS.GRAD.PROC. AREA 1400 TO 2450,240 TO 320.
1964	Y		SOURCE-RBA DIRECT HAUL. DENS.GRAD.PROC. AREA NOT STATED.
1967	Y		SOURCE-RBA 5300 TO 6200,200 RT. DENS.GRAD.PROC. AREA NOT STATED.
1969	N		SOURCE-RBA,6200 & KOLMAN SP. DENS.GRAD.PROC. AREA NOT STATED.
1972	Y		SOURCE-RBA OLD KOLMAN SP. DENS.GRAD.PROC. AREA NOT STATED.
1973	N		SOURCE-RBA 3500 TO 3700,BASAL. DENS.GRAD.PROC. AREA NOT STATED.
1977	N		SOURCE-RBA. DENS.GRAD.PROC. AREA NOT STATED.
1979	Y		SOURCE-RBA 6500 TO 6900,RIGHT. DENS.GRAD.PROC. AREA NOT STATED.
1981	Y		SOURCE-RBA KOCAL & NO BORROW MIX. DENS.GRAD.PROC. AREA NOT STATED.
1984	Y		SOURCE-RBA 6500 TO 6900,RIGHT. DENS.GRAD.PROC. AREA NOT STATED.
1986	Y		SOURCE-RBA 6200,RIGHT. DENS.GRAD.PROC. AREA NOT STATED.
1990	N		SOURCE-RBA. DENS.GRAD.PROC. AREA NOT STATED.
1996	Y		SOURCE-RBA 6400 TO 6500,RT. DENS.GRAD.PROC. AREA NOT STATED.
1998	Y		SOURCE.RBA 6500 TO 6900,RT. DENS.GRAD.PROC. AREA NOT STATED.
2004	Y		SOURCE-RBA MIX YA & OA. DENS.GRAD.PROC. AREA NOT STATED.
2007	N	OLD,M	SOURCE-RBA. DENS.GRAD.PROC. AREA 1225 TO 2250,130 TO 285.
2009	Y		SOURCE-RBA MIX. DENS.GRAD.PROC. AREA NOT STATED.
2015	N		SOURCE-RBA. DENS.GRAD.PROC. AREA NOT STATED.
2019	Y		SOURCE-RBA. DENS.GRAD.PROC. AREA NOT STATED.
2022	Y		SOURCE-RBA KOLMAN DIRECT HAUL MIX. DENS.GRAD.PROC. AREA NOT STATED.
2026	Y		SOURCE-RBA. DENS.GRAD.PROC. AREA NOT STATED.
2029	Y		SOURCE-RBA. DENS.GRAD.PROC. AREA NOT STATED.
2030	N		SOURCE-RBA. DENS.GRAD.PROC. AREA NOT STATED.

TEST NUMBER	TEST IN SPEC	STATUS FAILED TESTS	TEST COMMENTS
2031	N	RW	SOURCE-RBA. DENS.GRAD.PROC. AREA 1175 TO 1375,28 TO 220.
2034	Y		SOURCE-RBA. DENS.GRAD.PROC. AREA NOT STATED.
2039	N	OLM	SOURCE-RBA KOLMAN & DIRECT HAUL MIX. DENS.GRAD.PROC. AREA 1950 TO 2500,20 TO 135.
2041	Y		SOURCE-RBA KOLMAN & DIRECT HAUL MIX. DENS.GRAD.PROC. AREA NOT STATED.
2053	N	OLM	SOURCE-RBA 6700, KOCAL MIX. DENS.GRAD.PROC. AREA 1150 TO 1935,30 TO 120.
2062	Y		SOURCE-RBA KOLMAN. DENS.GRAD.PROC. AREA NOT STATED.
2076	Y		SOURCE-RBA KOLMAN. DENS.GRAD.PROC. AREA NOT STATED.
2078	N	OLM	SOURCE-RBA KOLMAN DIRECT HAUL 5700 TO 5900,300 RT. DENS.GRAD.PROC. AREA 1150 TO 1800,120 TO 250.
2083	N	OLM	SOURCE-RBA KOCAL/KOLMAN. DENS.GRAD.PROC. AREA 1850 TO 2500,26 TO 140.
2035	N		SOURCE-RBA 5500 & 6700 TO 6900. DENS.GRAD.PROC. AREA NOT STATED.
2089	N	OLD	SOURCE-RBA KOLCAL/KOLMAN MIX. DENS.GRAD.PROC. AREA 1150 TO 1900,100 TO 240.
2092	N	OLM	SOURCE-RBA KOLMAN. DENS.GRAD.PROC. AREA 1980 TO 2100,20 TO 100.
2104	Y		SOURCE-RBA KOCAL & KOLMAN. DENS.GRAD.PROC. AREA NOT STATED.
2109	N	OLM	SOURCE-RBA KOLMAN. DENS.GRAD.PROC. AREA 2000 TO 2550,26 TO 95.
2111	Y		SOURCE-RBA. DENS.GRAD.PROC. AREA NOT STATED.
2117	N	OLM	SOURCE-RBA KOCAL & KOLMAN. DENS.GRAD.PROC. AREA 1150 TO 1960,26 TO 120.
2121	N		SOURCE-RBA & PEOA. DENS.GRAD.PROC. AREA NOT STATED.
2122	N		SOURCE-RBA. DENS.GRAD.PROC. AREA NOT STATED.
2123	N		SOURCE-RBA. DENS.GRAD.PROC. AREA NOT STATED.
2126	N	OLM	SOURCE-RBA KOCAL. DENS.GRAD.PROC. AREA 2100 TO 2500,25 TO 180.
2128	Y		SOURCE-RBA & PEOA SA & GR. DENS.GRAD.PROC.
2129	Y		SOURCE-RBA KOCAL. DENS.GRAD.PROC.
2133	N	OLD,M	SOURCE-RBA. DENS.GRAD.PROC. AREA 1150 TO 2150,130 TO 230.
2138	Y		SOURCE-RBA. DENS.GRAD.PROC.
2139	N	OLM	SOURCE-RBA. DENS.GRAD.PROC. NEAR RIGHT ABUTMENT. NOT WHEEL ROLLED. AREA 2130 TO 2550,25 TO 160.
2142	N		SOURCE-RBA. DENS.GRAD.PROC. NEAR LEFT ABUTMENT. WHEEL ROLLED.
2147	N	OLM	SOURCE-RBA. DENS.GRAD.PROC. AREA 1125 TO 2150,100 TO 220.
2148	N	OLM	SOURCE-RBA. DENS.GRAD.PROC. AREA 1736 TO 2550,24 TO 105.
2162	Y		SOURCE-RBA. DENS.GRAD.PROC.
2165	Y		SOURCE-RBA,SBS. DENS.GRAD.PROC. FINES ARE NON-PLASTIC.
2174	Y		SOURCE-RBA & PEOA MIX. DENS.GRAD.PROC.
2177	N		SOURCE-RBA. DENS.GRAD.PROC.
2179	N		SOURCE-RBA. DENS.GRAD.PROC.
2184	N	OLM	SOURCE-RBA. DENS.GRAD.PROC. AREA 1750 TO 2550,160 TO 220..
2185	N	RW	SOURCE-RBA. DENS.GRAD.PROC. AREA 1750 TO 2525,25 TO 115.
2190	N		SORCE-RBA KOCAL. DENS.GRAD.PROC.
2187	N		SOURCE-RBA KOCAL & KOLMAN. DENS.GRAD.PROC.
2198	N	OLM	SOURCE-RBA. DENS.GRAD.PROC. AREA 1125 TO 1900,22 TO 100.
2201	Y		SOURCE-RBA. DENS.GRAD.PROC.
2207	Y		SOURCE-RBA. DENS.GRAD.PROC.
2208	N	RW	SOURCE-RBA KOLMAN. DENS.GRAD.PROC. REWORKED NOT RETESTD.
2211	Y		SOURCE-RBA. DENS.GRAD.PROC.
2214	N		SOURCE-RBA 5200 TO 5300,400 LFT. DENS.GRAD.PROC.
2216	N		SOURCE-RBA. DENS.GRAD.PROC.
2217	N		SOURCE-RBA & PEOA SA & GR. DENS.GRAD.PROC.
2220	Y		SOURCE-RBA KOCAL & KOLMAN. DENS.GRAD.PROC.
2221	Y	RM	SOURCE-RBA. DENS.GRAD.PROC.
2225	Y		SOURCE-RBA KOLMAN KOLCAL. DENS.GRAD.PROC.
2233	N		SOURCE-RBA KOCAL & CRUSHER RUN. DENS.GRAD.PROC.
2226A	Y		SOURCE-RBA KOCAL & CRUSHER RUN. DENSITY & GRADATION. CHECK OF PRIOR TEST 2226.
2238	Y		SOURCE-RBA KOLMAN & KOCAL & PEOA SA & GR. DENS.GRAD.PROC.
2239	Y		SOURCE-RBA. DENS.GRAD.PROC.

TEST NUMBER	TEST IN SPEC	STATUS FAILED TESTS	TEST COMMENTS
2241	Y		SOURCE-RBA KOKAL & KOLMAN. DENS.GRAD.PROC.
2246	N		SOURCE-RBA. DENS.GRAD.PROC.
2250	Y		SOURCE-RBA KOLMAN & KOCAL & PEOA SA & GR. DENS.GRAD.PROC.
2253	Y		SOURCE-RBA. DENS.GRAD.PROC.
2254	N	OLM	SOURCE-RBA KOCAL & CRUSHER RUN. DENS.GRAD.PROC. AREA 1100 TO 1750,20 TO 90.
2260	Y		SOURCE-RBA KOLMAN & KOCAL. DENS.GRAD.PROC. AREA 1100 TO 1750,20 TO 90.
2263	N		SOURCE-RBA. DENS.GRAD.PROC.
2268	N		SOURCE-RBA. DENS.GRAD.PROC. AREA 1700 TO 2650,100 TO 150.
2270	Y		SOURCE-RBA. DENS.GRAD.PROC.
2271	N	RM	SOURCE-RBA & EXTENDED & CRUSHER RUN. DENS.GRAD.PROC. NEAR LEFT ABUTMENT. AREA 1125 TO 1150,20 TO 150.
2274	N		SOURCE-RBA KOCAL & CRUSHER RUN. DENS.GRAD.PROC.
2277	Y		SOURCE-RBA KOLMAN. DENS.GRAD.PROC. SEE ALSO TEST 2277A. AREA 1850 TO 2550,100 TO 145. AVE 2277&2277A. 114.5,10.4
2282	Y		SOURCE-RBA & CRUSHER RUN. DENS.GRAD.PROC.
2299	N		SOURCE-RBA CRUSHER RUN. DENS.GRAD.PROC. ROLLER PASSES INCREASED 09-11-92 SECOND SHIFT.
2309	Y		SOURCE-RBA KOLMAN. DENS.GRAD.PROC.
2312	N		SOURCE-RBA KOLCAL. DENS.GRAD.PROC. AREA 1100 TO 2700,70 TO 100.
2328	Y		SOURCE-RBA CRUSHER RUN. DENS.GRAD.PROC.
2344	Y		SOURCE-RBA CRUSHER RUN. DENS.GRAD.PROC.
2349	N	OLD	SOURCE-RBA KOCAL. DENS.GRAD.PROC. AREA 1275 TO 2630.
2356	N		SOURCE-RBA KOCAL. DENS.GRAD.PROC.
2360	N	OLM	SOURCE-RBA. DENS.GRAD.PROC. AREA 1060 TO 2750,16 TO 50.
2369	N	OLM	SOURCE-RBA CRUSHER RUN. DENS.GRAD.PROC. AREA 1050 TO 2750.
2374	Y		SOURCE-RBA KOCAL. DENS.GRAD.PROC.
2377	N		SOURCE-RBA. DENS.GRAD.PROC. AREA 2150 TO 2700.
2387	Y		SOURCE-RBA CRUSHER STOCKPILE. DENS.GRAD.PROC.
2393	N		SOURCE-RBA OVERBUILD EXCAVATION. DENS.GRAD.PROC.
2396	N		SOURCE-RBA OVERBUILD EXCAVATION. DENS.GRAD.PROC.
2398	N		SOURCE-RBA OVERBUILD EXCAVATION. DENS.GRAD.PROC.

COMMENT: THIS REPORT COVERS THE ENTIRE CONSTRUCTION OF THE DAM.

LAB CHIEF: ______________________ SUBMITTED BY: ______________________
PROJECT ENGINEER



PROJECT: LITTLE DELL LAKE, DAM AND APP.
DISTRICT: CESPK
DATE OF REPORT : 12-07-1992
REPORT PERIOD : 01-01-90 thru 12-31-92
REPORT NUMBER : RII.4
TYPE OF MATERIAL: RANDOM II

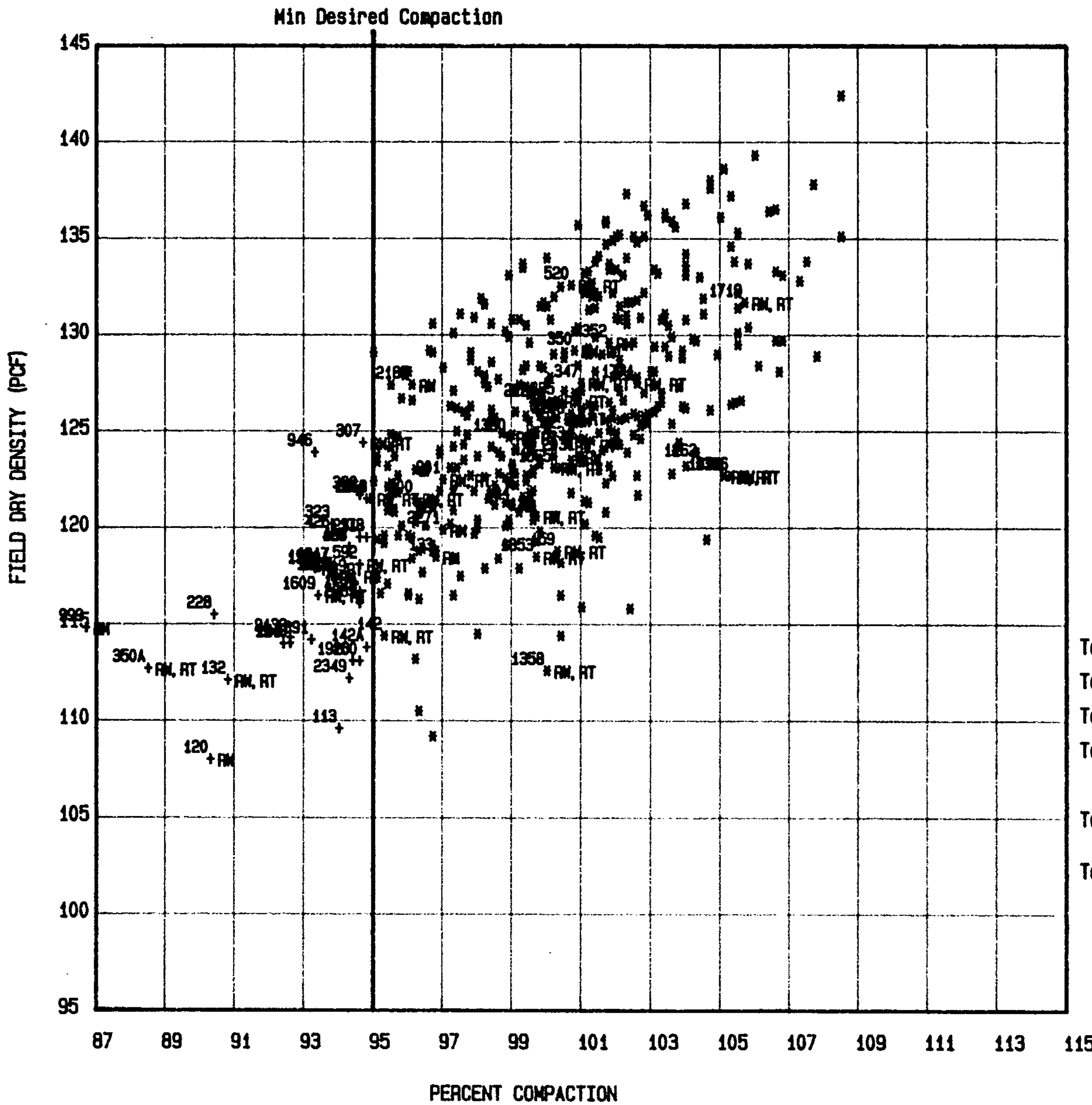
LEGEND

* - Test within Specifications
\+ - Test is out of Specification
RW - Test Location Reworked - No Retest
RW, RT - Test Location Reworked and Retested
RM - Test Location Removed

	All Tests to Date	Tests this Report
Total Number of Tests Locs.	447	447
Test Locations Reworked Only	4	4
Test Loc. Reworked and Retested	29	29
Test Locations Removed	7	7

Tests Outside Specifications in Permanent Fill

Total Out of Spec.	75	75
Total Out on M.C.	47	47
Total Out on % Comp.	20	20
Total Out on M.C. and % Comp.	8	8



PROJECT: LITTLE DELL LAKE, DAM AND APP.
DISTRICT: CESPK
DATE OF REPORT : 12-07-1992
REPORT PERIOD : 01-01-90 thru 12-31-92
REPORT NUMBER : RII.5
TYPE OF MATERIAL: RANDOM II

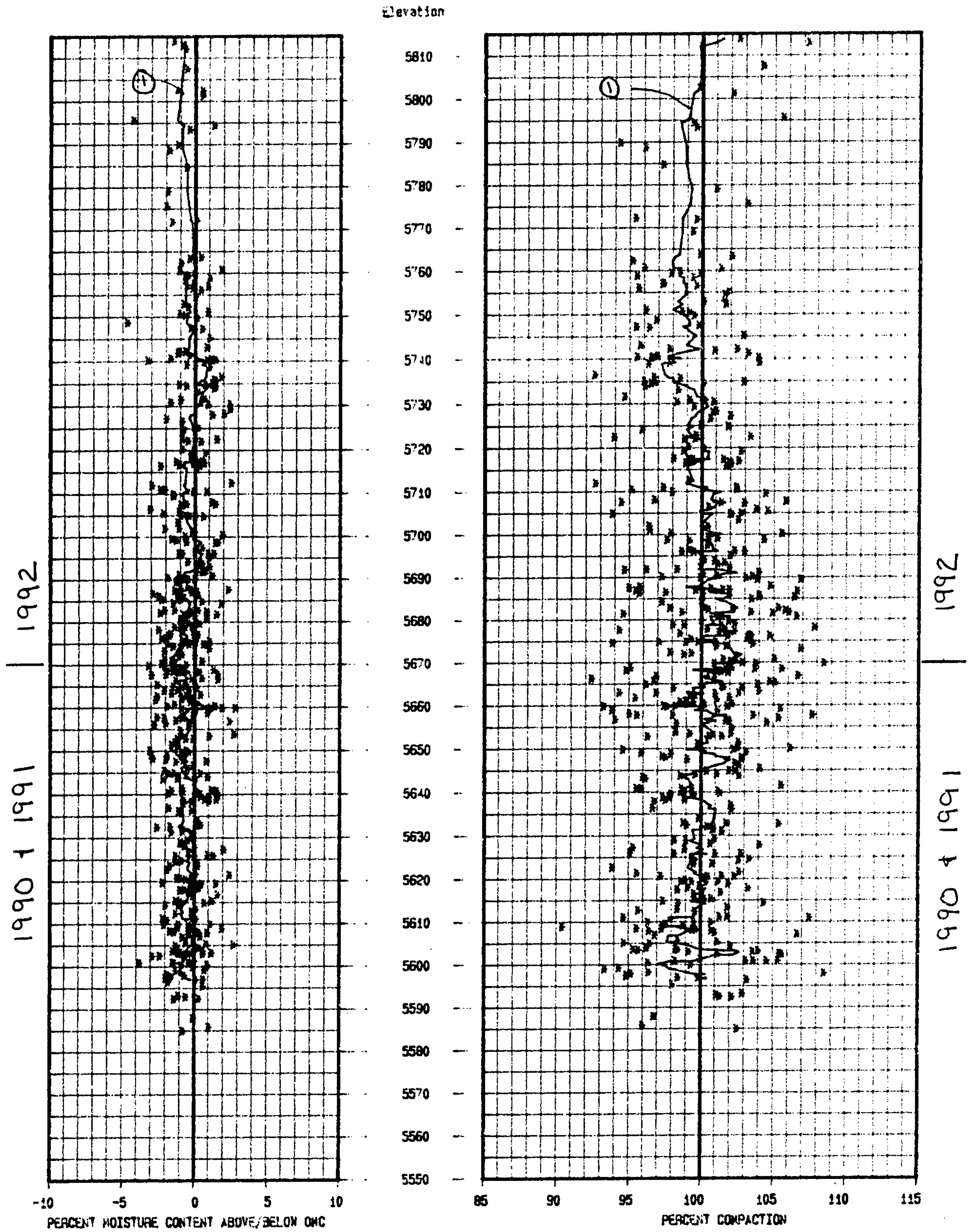
LEGEND

- * - Test within Desired Limits
- \+ - Test is out of Desired Limits
- RW - Test Location Reworked - No Retest
- RW,RT - Test Location Reworked and Retested
- RM - Test Location Removed

	All Tests to Date	Tests this Report
Total Number of Tests Locs.	447	447
Test Locations Reworked Only	4	4
Test Loc. Reworked and Retested	29	29
Test Locations Removed	7	7

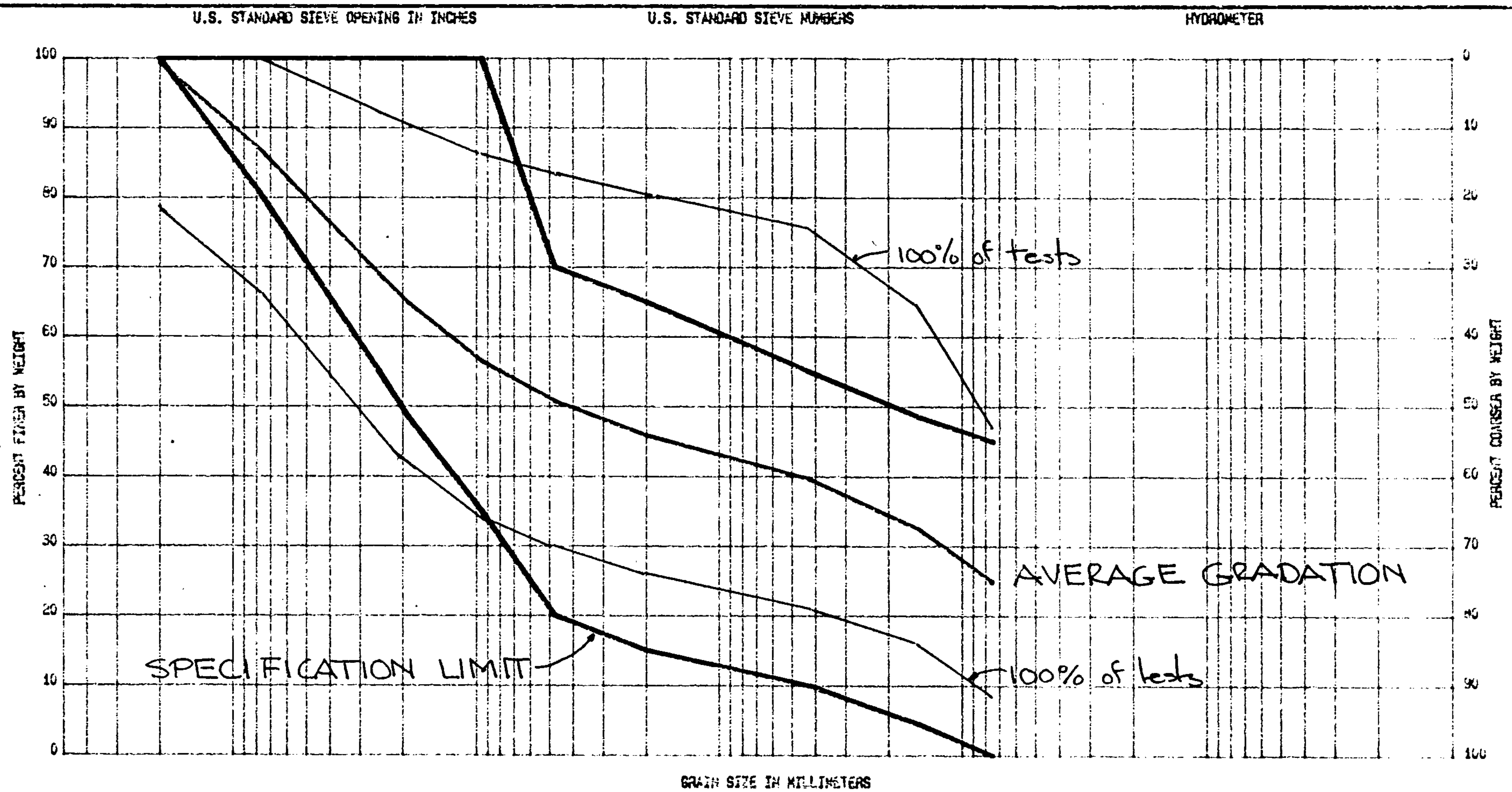
Tests Below Desired Compaction Limits in Fill

Total Out of % Comp.	28	28



① Curve represents a running average of 10 tests

RANDOM II



Curves represent all data from 1990, 1991, 1992

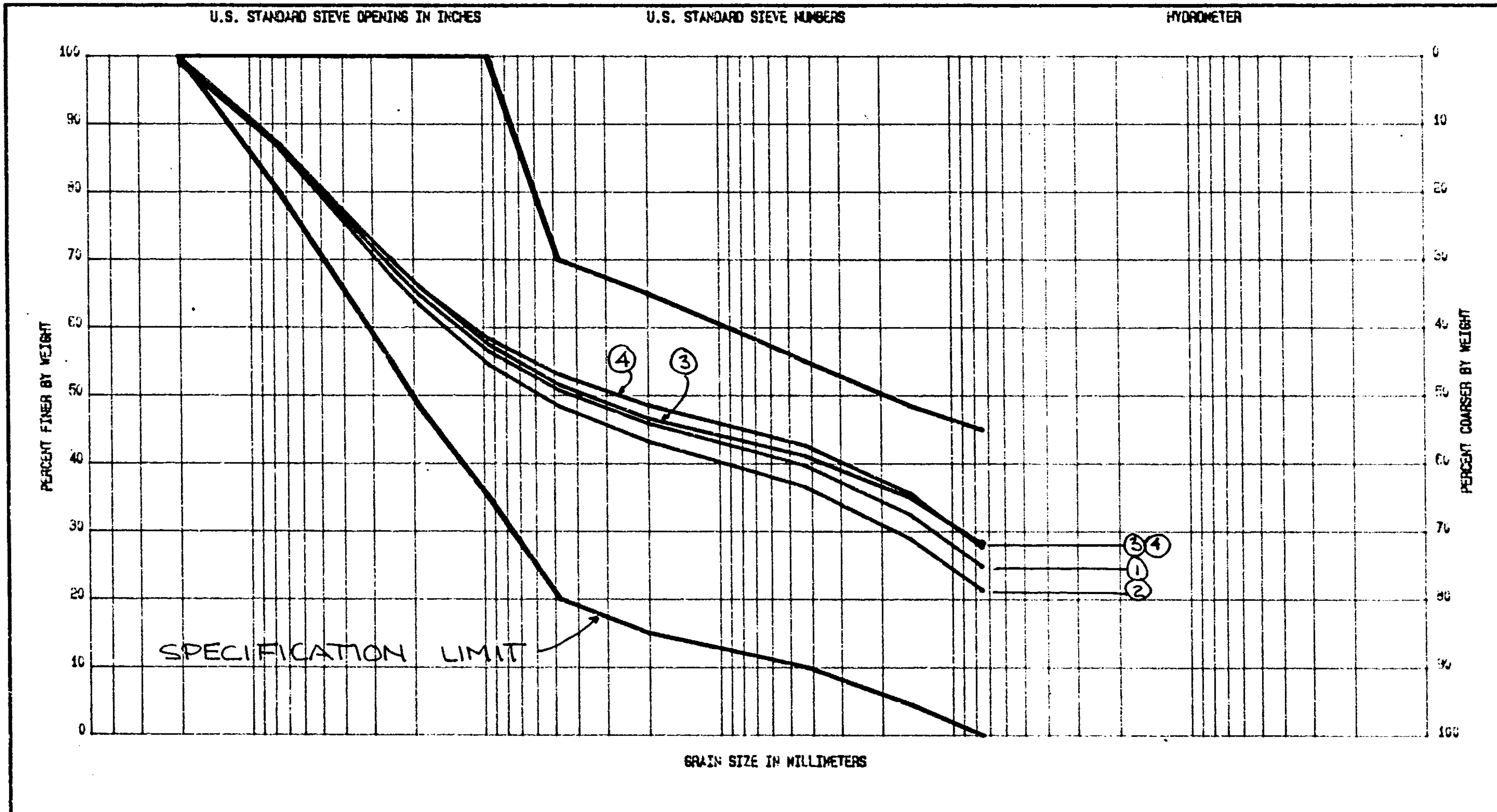
GRADATION CURVES

Project **LITTLE DELL DAM**

Area **RANDOM II**

Boring No.

Date



① 1990, 1991, 1992
② 1990
③ 1991
④ 1992

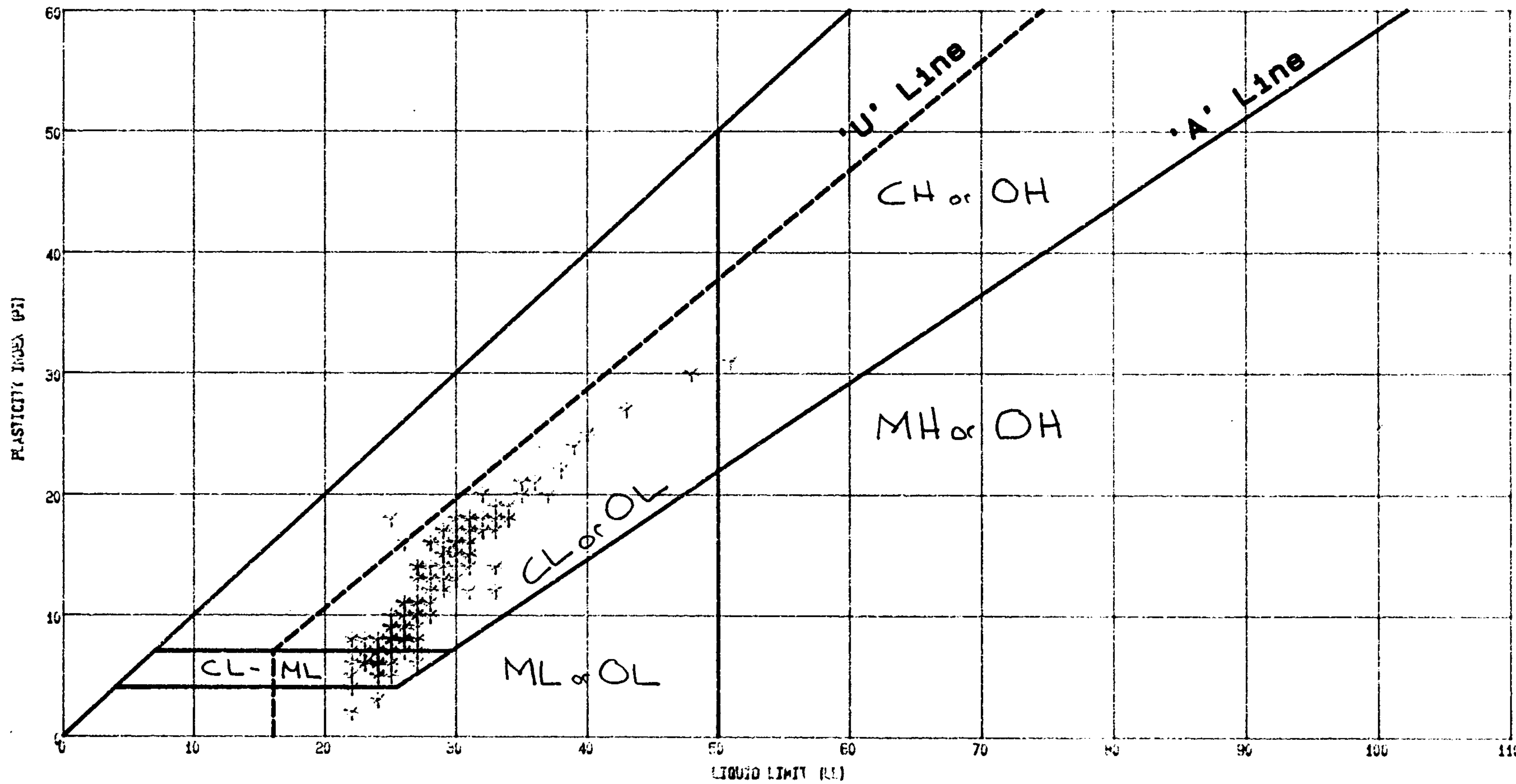
AVERAGE **GRADATION CURVES** BY YEAR

Project **LITTLE DELL DAM**

Area **RANDOM II**

Boring No.

Date



Represents all test data for 1990, 1991, 1992

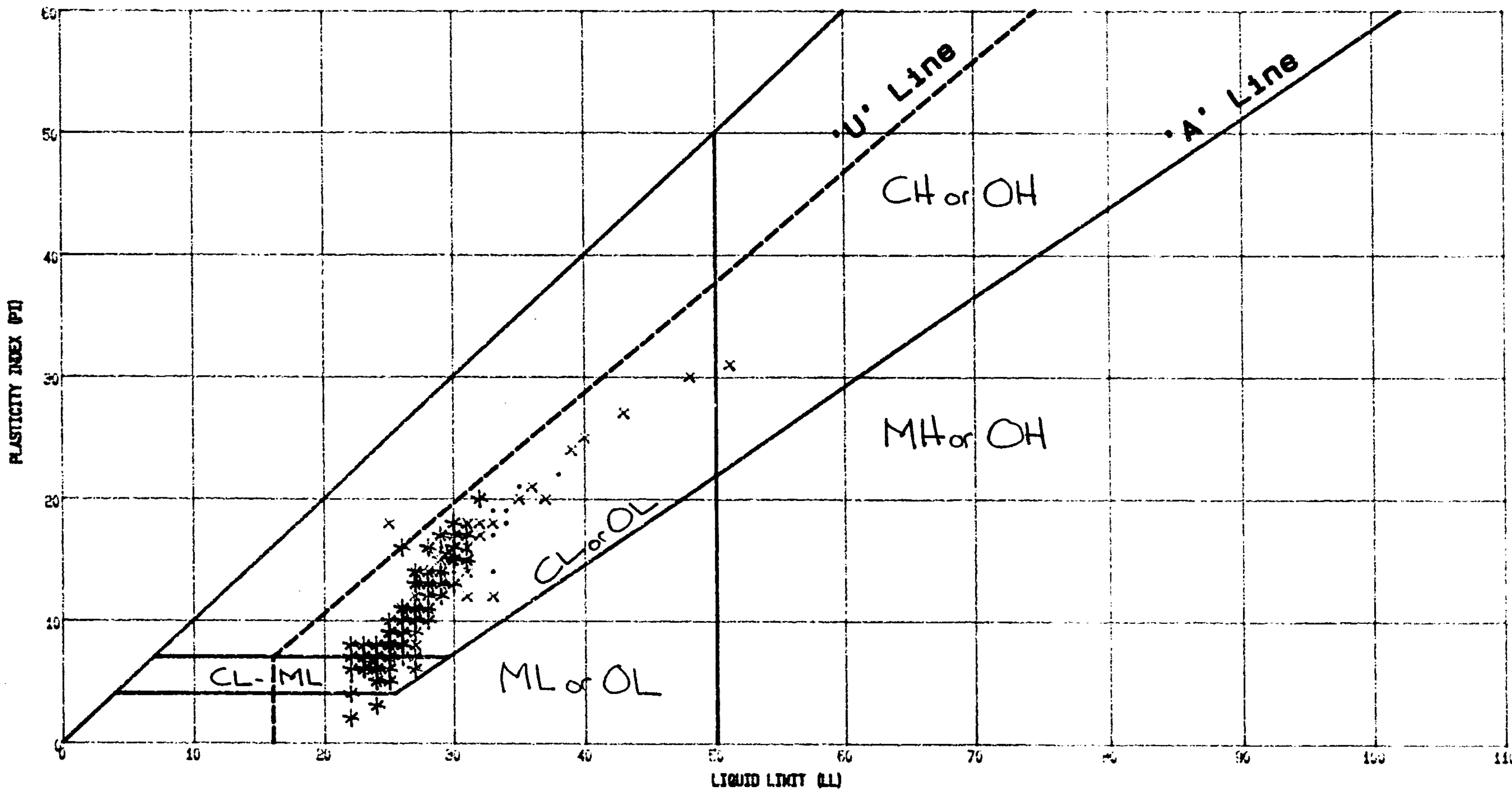
PLASTICITY CHART

Project **LITTLE DELL DAM**

Area **RANDOM II**

Boring No.

Date



*	1990
•	1991
×	1992

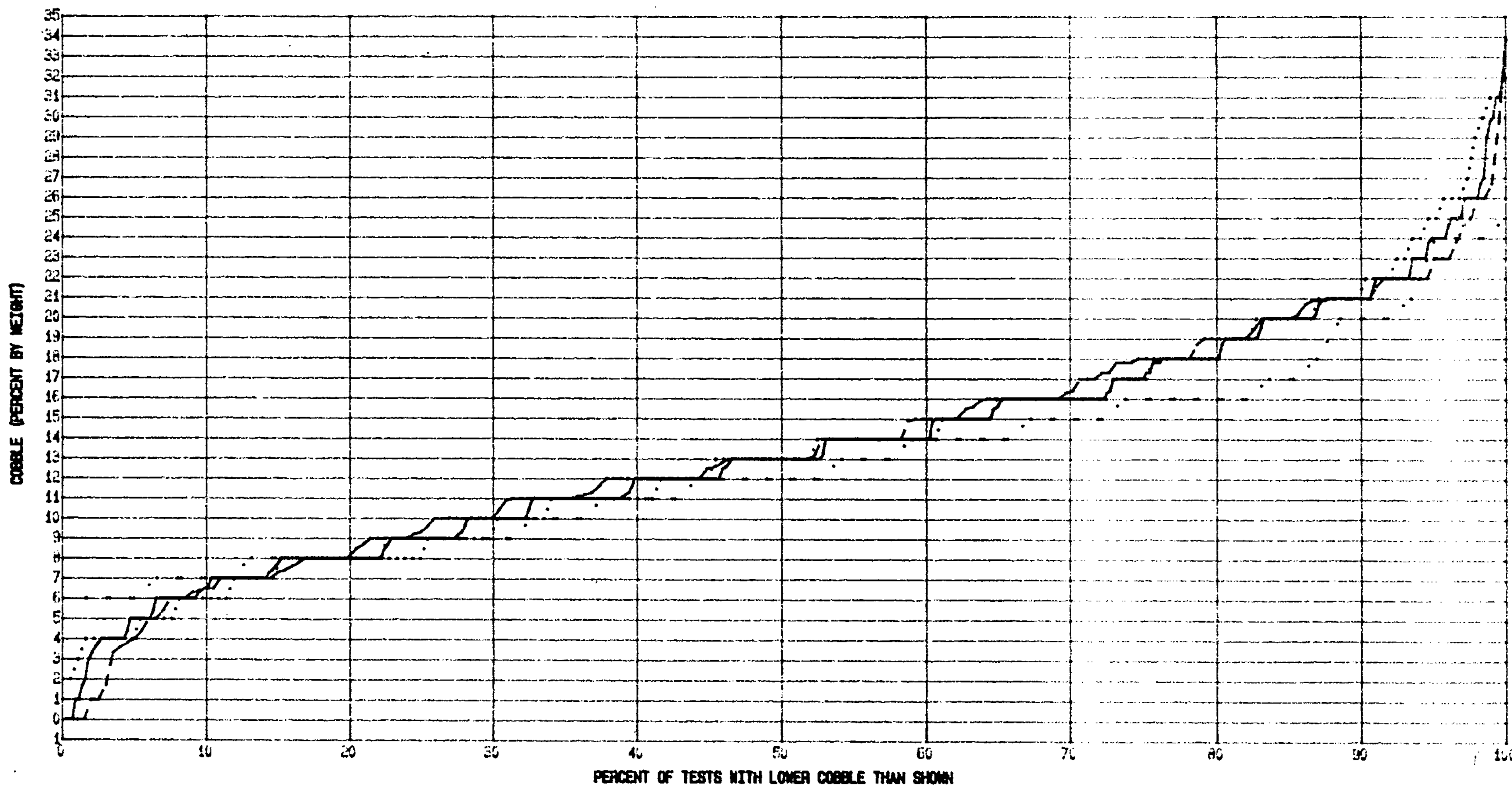
PLASTICITY CHART

Project LITTLE DELL DAM

Area RANDOM II

Boring No.

Date



Line Style	From Date	To Date	# Points	Mean	Std Dev	10 %	Median	90 %
....	01-01-92	12-31-92	185	13.62162	6.192348	6	13	21
. . . . . .	01-01-91	12-31-91	61	12.93443	4.891724	7	12	20
– – – – –	01-01-90	12-31-90	201	13.64229	5.94019	6.5	13	21
———	01-01-90	12-31-92	447	13.53714	5.909275	6.5	13	21

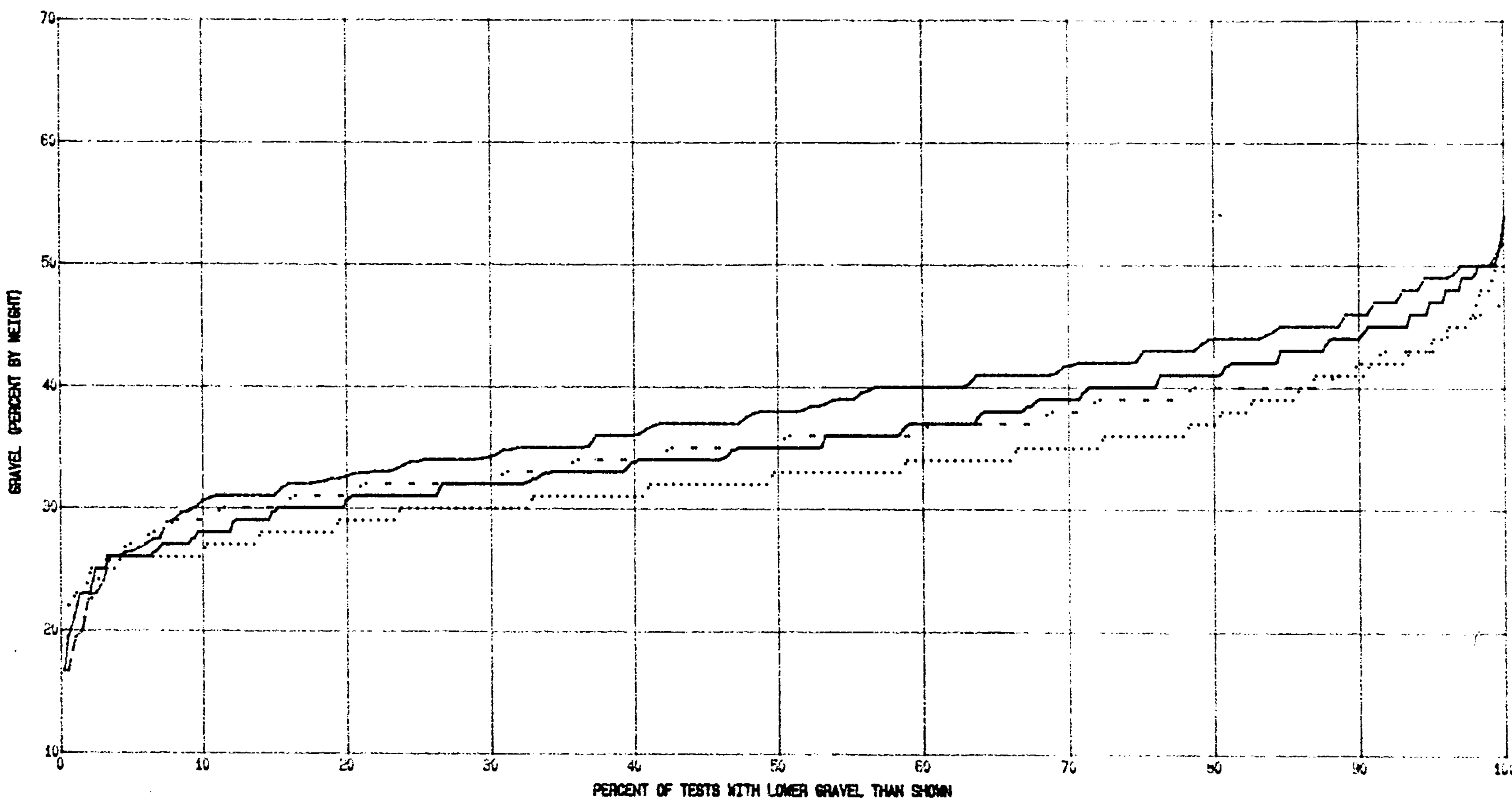
COBBLE – S-CURVE

Project LITTLE DELL DAM

Area RANDOM II

Boring No.

Date



Line Style	From Date	To Date	# Points	Mean	Std Dev	10 %	Median	90 %
....	01-01-92	12-31-92	185	33.34595	5.596303	26	33	41
. . . . . .	01-01-91	12-31-91	61	35.54099	5.061534	29	35	41
— — — —	01-01-90	12-31-90	201	37.97214	6.566705	30.6	38	46
————	01-01-90	12-31-92	447	35.72573	6.346374	28	35	44

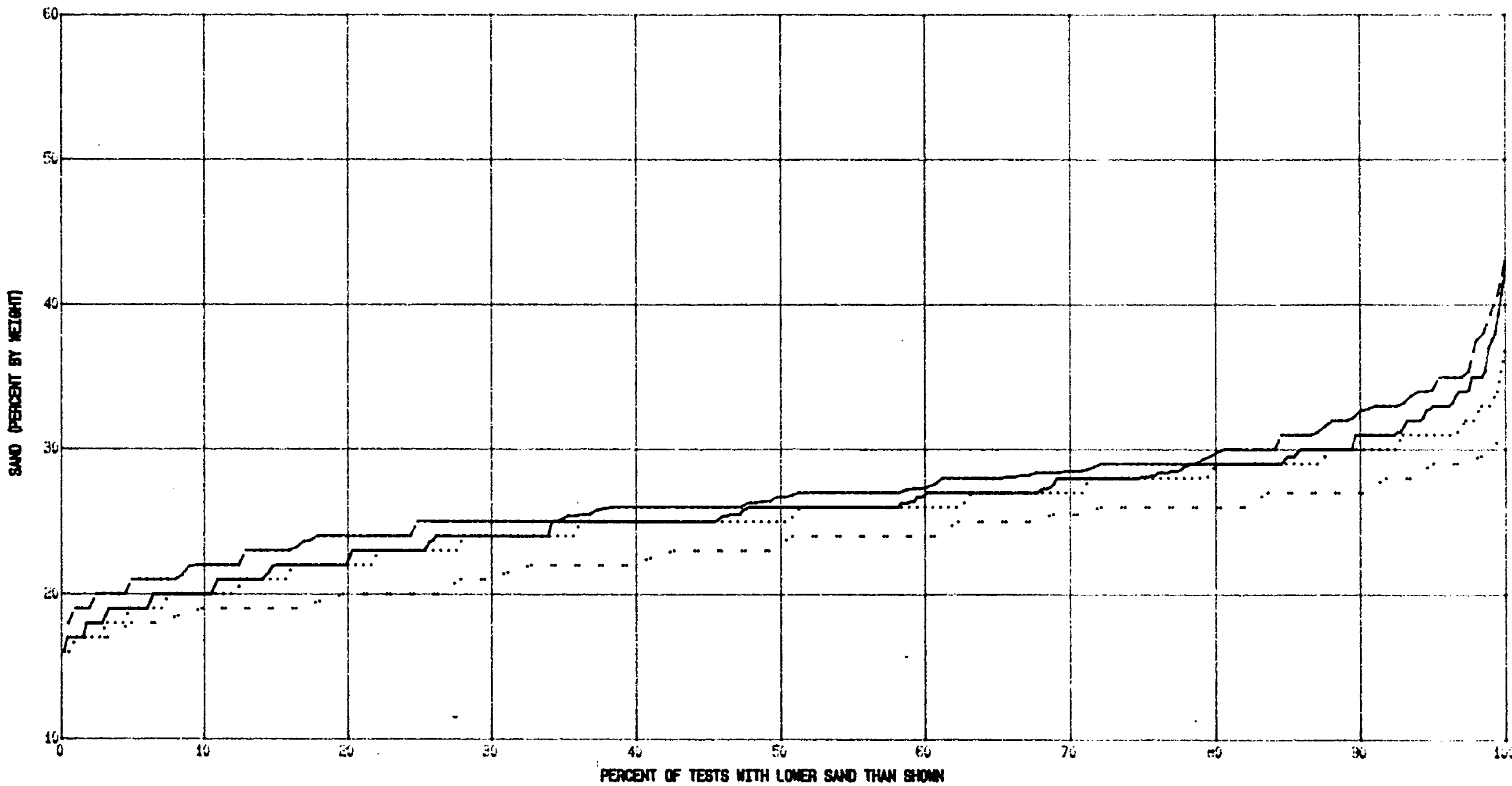
GRAVEL - S-CURVE

Project **LITTLE DELL DAM**

Area **RANDOM II**

Boring No.

Date



Line Style	From Date	To Date	# Points	Mean	Std Dev	10 %	Median	90 %
dotted (fine)	01-01-92	12-31-92	185	25.3773	3.740342	20	25	30
dotted (wide)	01-01-91	12-31-91	61	23.35246	3.401402	19	23	27
dashed	01-01-90	12-31-90	201	27.00896	4.119129	22	26.7	32.2
solid	01-01-90	12-31-92	447	25.83468	4.060515	20	26	31

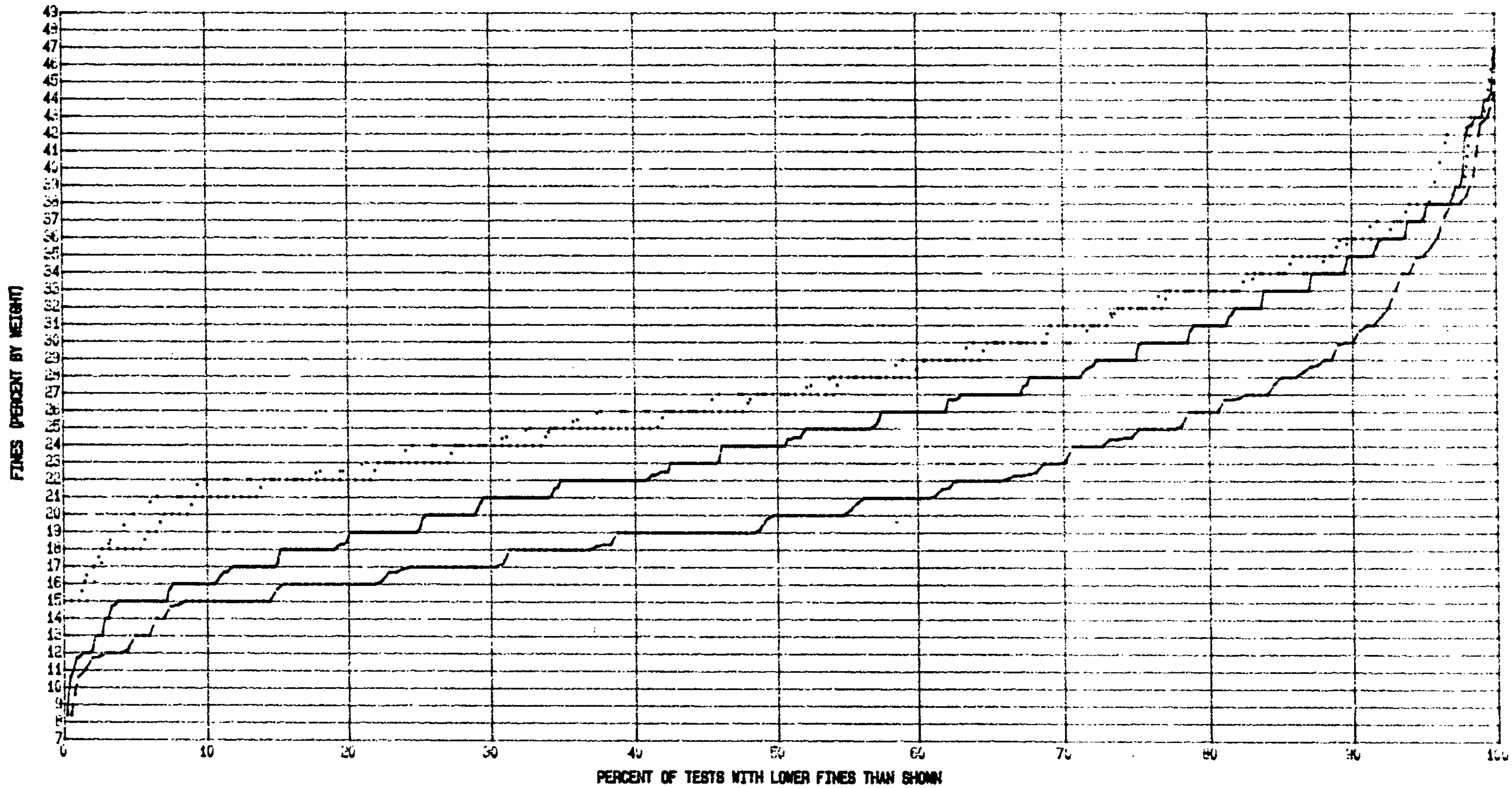
SAND - S-CURVE

Project LITTLE DELL DAM

Area RANDOM II

Boring No.

Date



Line Style	From Date	To Date	# Points	Mean	Std Dev	10 %	Median	90 %
. . . .	01-01-92	12-31-92	185	27.65513	6.035202	21	27	36
. . . . . .	01-01-91	12-31-91	61	28.17213	5.95111	22	27	35
— — — — —	01-01-90	12-31-90	201	21.37662	6.608993	15	20	30
————————	01-01-90	12-31-92	447	24.90246	7.041719	16	24	35

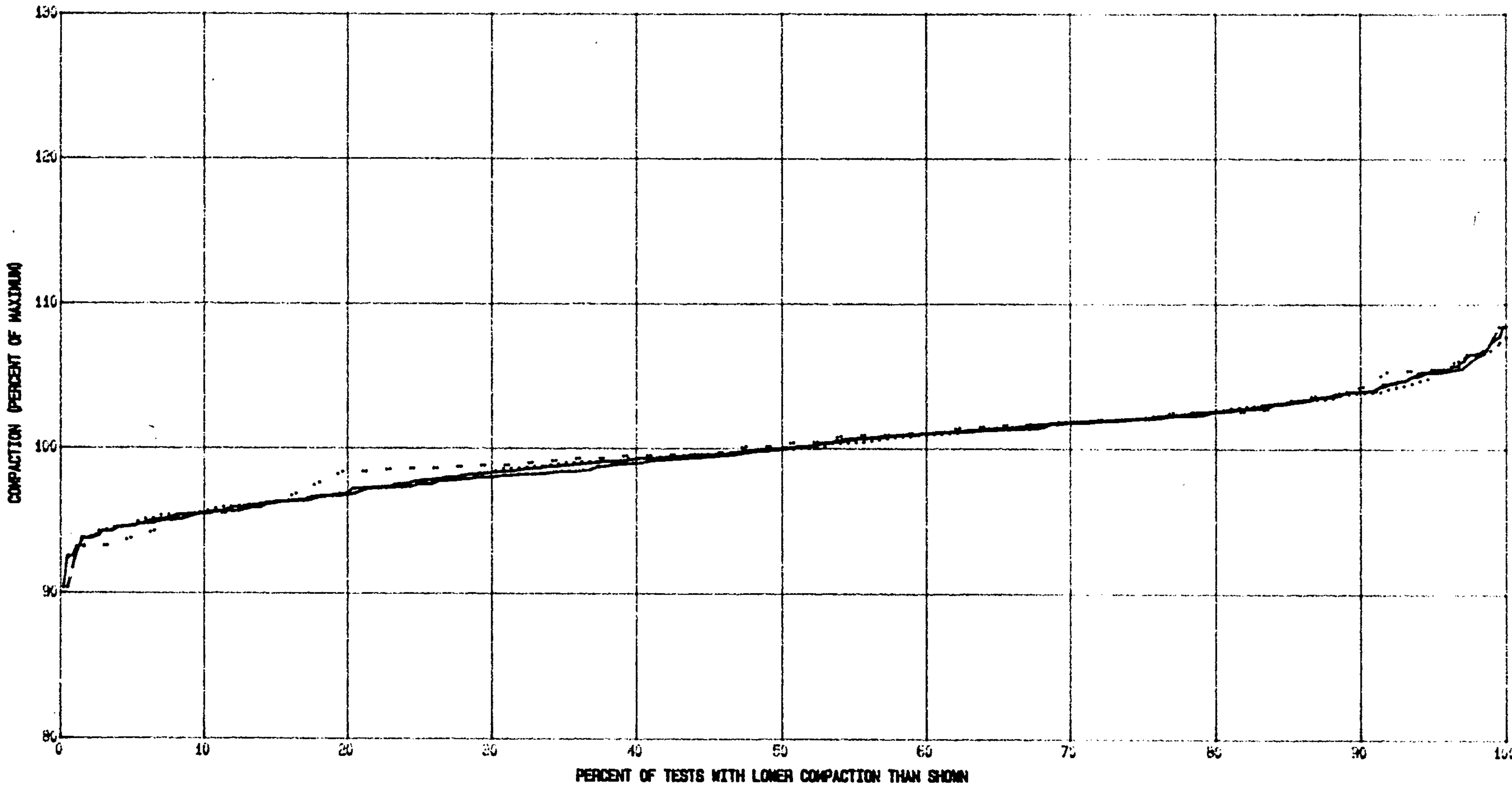
FINES - S-CURVE

Project LITTLE DELL DAM

Area RANDOM II

Boring No.

Date



Line Style	From Date	To Date	# Points	Mean	Std Dev	10 %	Median	90 %
....	01-01-92	12-31-92	186	100.0227	3.167803	95.59505	100	103.871
. . . . . .	01-01-91	12-31-91	61	100.3189	3.260311	95.5259	100.1661	103.8651
— — — —	01-01-90	12-31-90	201	99.91988	3.277044	95.50225	99.92413	103.9689
———	01-01-90	12-31-92	447	100.0169	3.225556	95.53991	100	103.9689

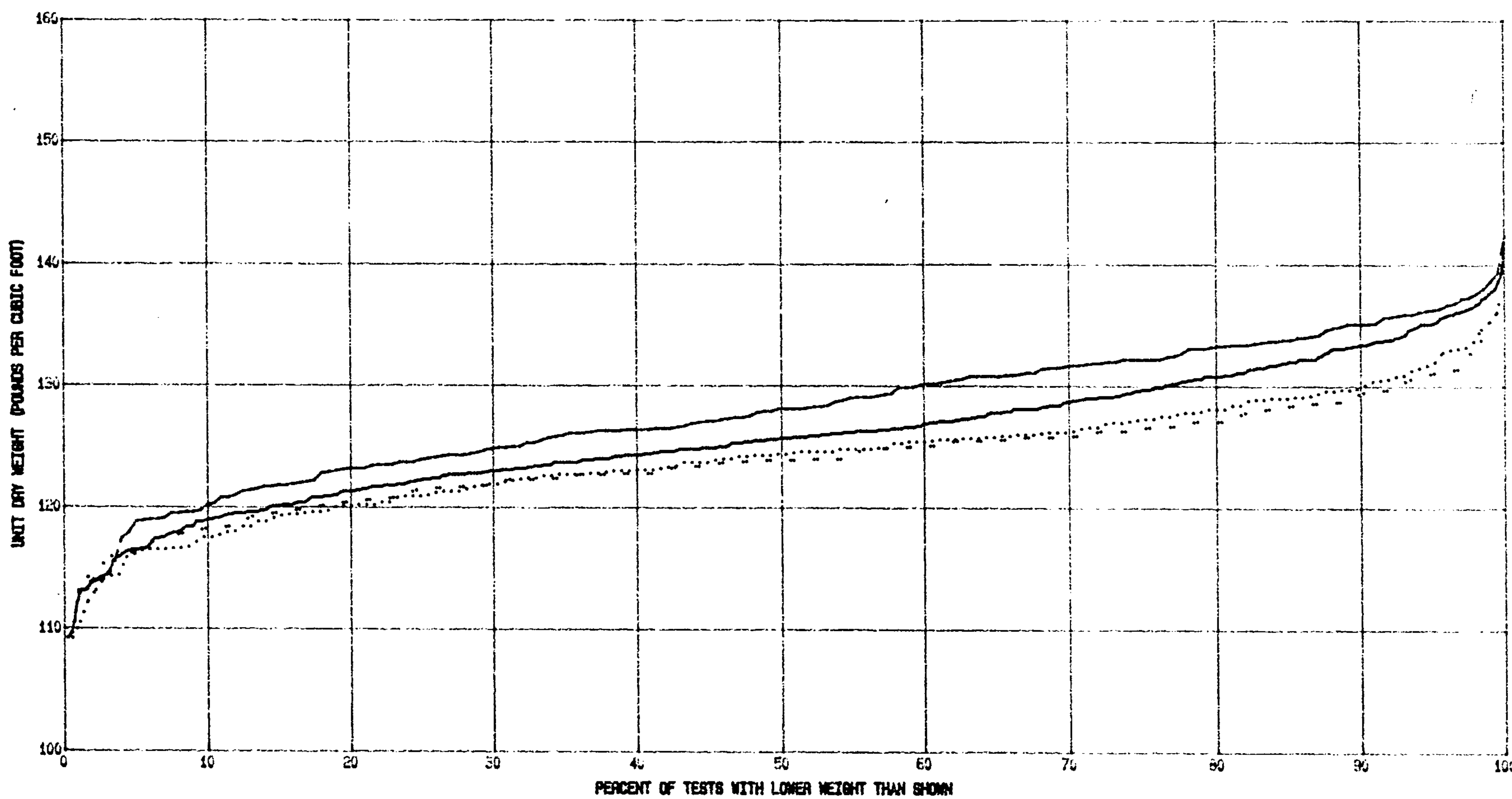
Project LITTLE DELL DAM

Area RANDOM II

Boring No.

Date

IN PLACE COMPACTION - S-CURVE



Line Style	From Date	To Date	# Points	Mean	Std Dev	10 %	Median	90 %
....	01-01-92	12-31-92	185	124.1389	4.923062	117.5	124.4	129.8
. . . . . .	01-01-91	12-31-91	61	124.141	4.420284	118.2	123.9	128.7
– – – – –	01-01-90	12-31-90	201	127.9179	5.815236	120.2	128.1	135.1
———	01-01-90	12-31-92	447	125.8385	5.595814	118.9	125.7	133.4

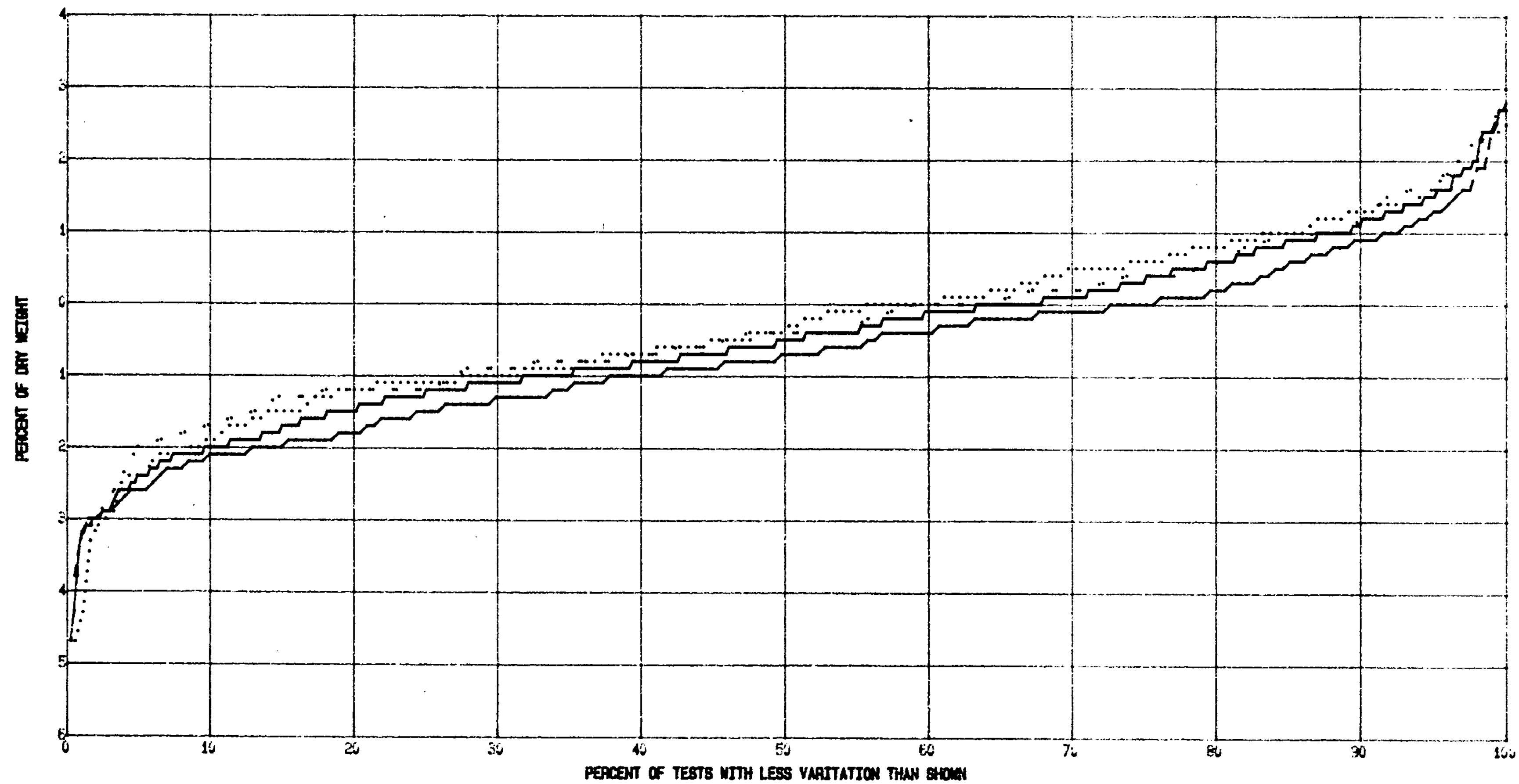
IN PLACE UNIT WEIGHT - S-CURVE

Project LITTLE DELL DAM

Area RANDOM II

Boring No.

Date



Line Style	From Date	To Date	# Points	Mean	Std Dev	10 %	Median	90 %
....	01-01-92	12-31-92	186	-.2866753	1.262022	-1.9	-.4	1.3
. . . . . .	01-01-91	12-31-91	61	-.2655738	1.170311	-1.7	-.4	1
— — — —	01-01-90	12-31-90	201	-.6771145	1.183374	-2.1	-.7	.9
———	01-01-90	12-31-92	447	-.4630874	1.227561	-2	-.5	1.1

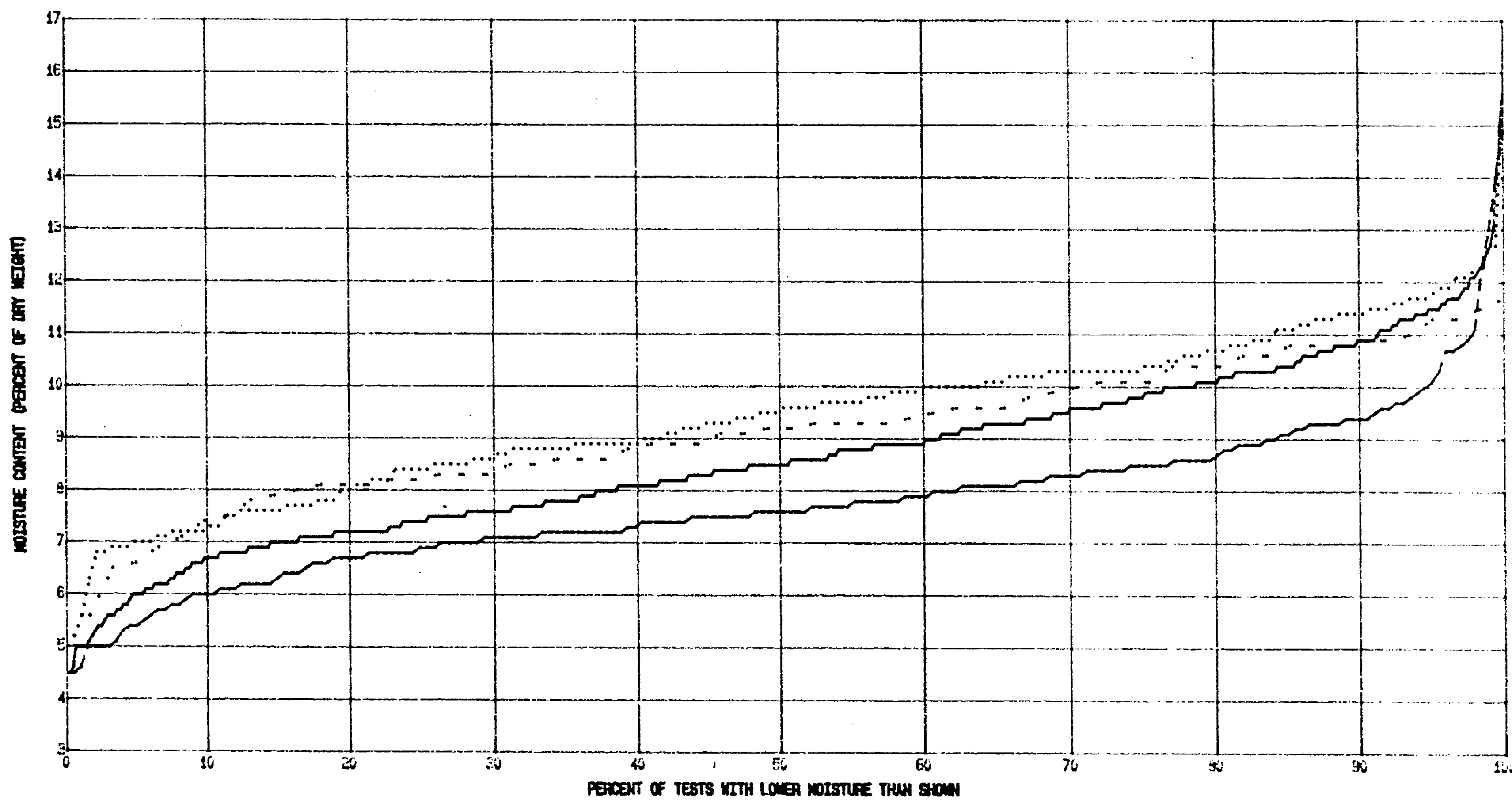
OMC COMPARISON - S-CURVE

Project LITTLE DELL DAM

Area RANDOM II

Boring No.

Date



Line Style	From Date	To Date	# Points	Mean	Std Dev	10 %	Median	90 %
	01-01-92	12-31-92	186	9.449732	1.557188	7.2	9.5	11.4
	01-01-91	12-31-91	61	9.181966	1.343823	7.4	9.2	10.8
	01-01-90	12-31-90	201	7.765175	1.519398	6	7.6	9.4
	01-01-90	12-31-92	447	8.65571	1.713271	6.7	8.5	10.9

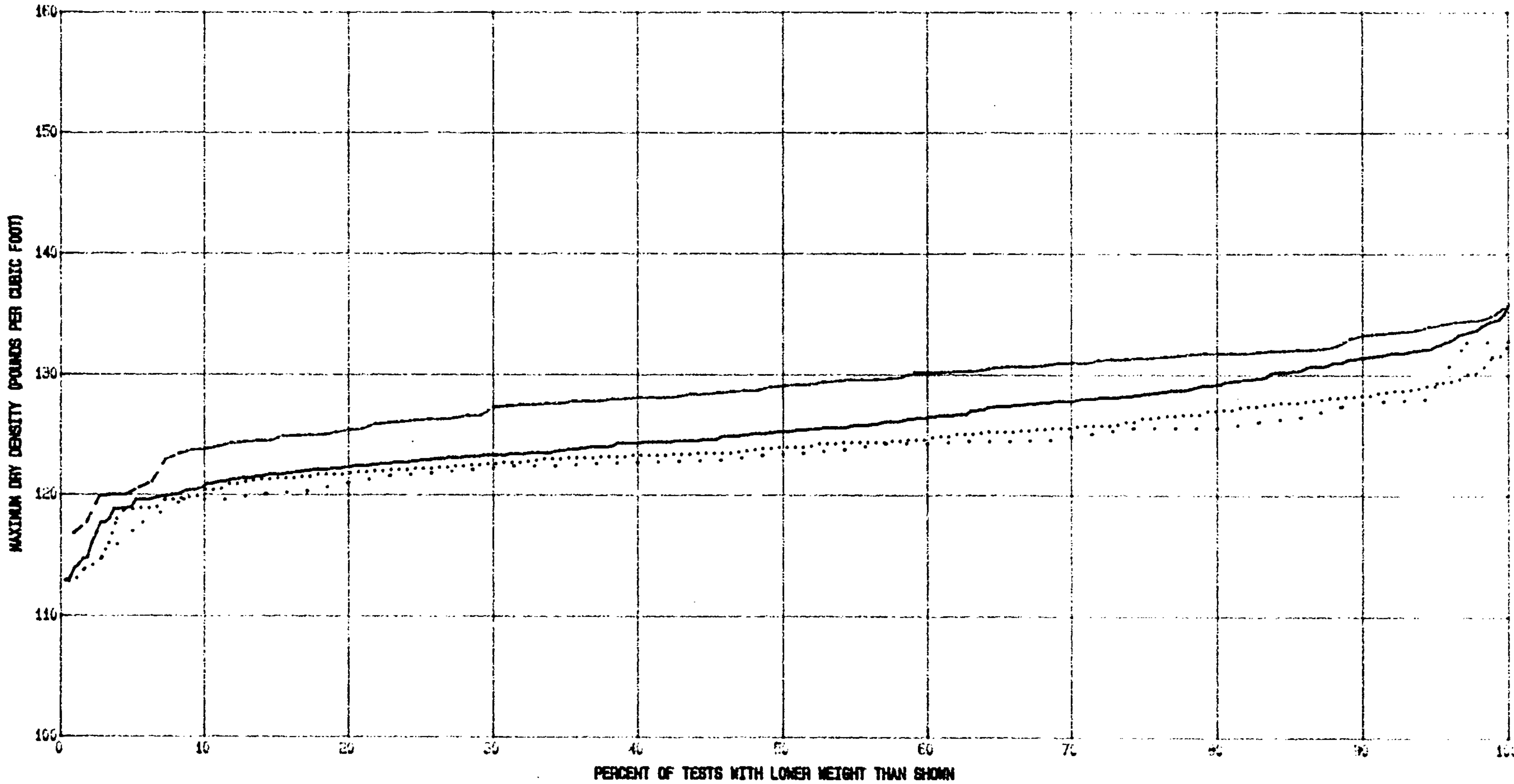
MOISTURE CONTENT - S-CURVE

Project LITTLE DELL DAM

Area RANDOM II

Boring No.

Date



Line Style	From Date	To Date	# Points	Mean	Std Dev	10 %	Median	90 %
....	01-01-92	12-31-92	179	124.1044	3.403826	119.8	124	128.3
. . . . . .	01-01-91	12-31-91	35	123.7257	3.598949	119.6	123.3	127.4
— — — —	01-01-90	12-31-90	110	128.6382	3.829146	123.8	129.1	133.3
———	01-01-90	12-31-92	324	125.6028	4.177584	120.6	125.3	131.4

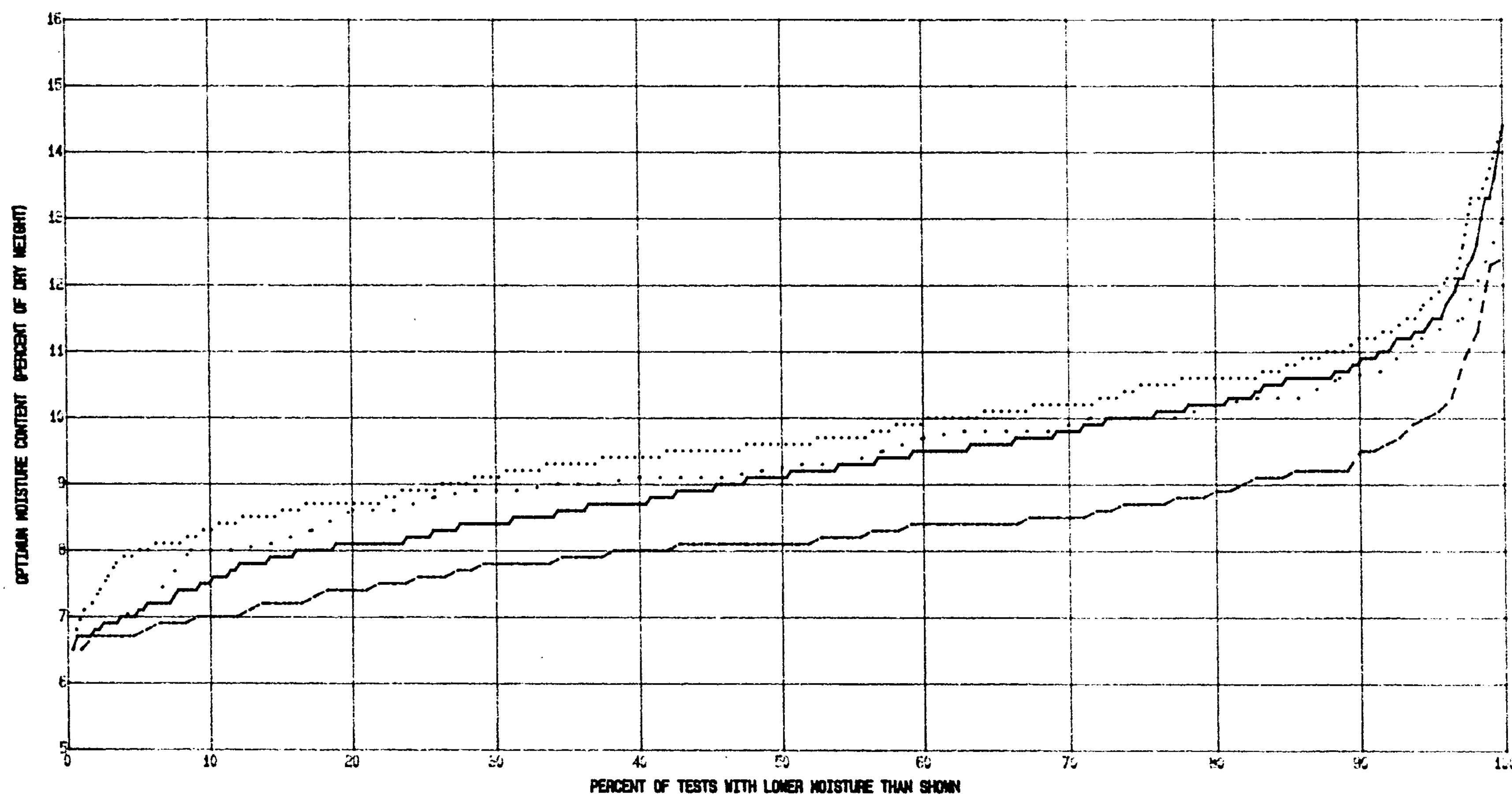
LABORATORY MAX. DRY DENSITY - S-CURVE

Project LITTLE DELL DAM

Area RANDOM II

Boring No.

Date



Line Style	From Date	To Date	# Points	Mean	Std Dev	10 %	Median	90 %
....	01-01-92	12-31-92	179	9.748601	1.238379	8.3	9.6	11.2
. . . . . .	01-01-91	12-31-91	35	9.422857	1.192401	8	9.2	10.6
– – – – –	01-01-90	12-31-90	110	8.269093	1.061385	7	8.1	9.5
———	01-01-90	12-31-92	324	9.211115	1.357199	7.5	9.1	10.8

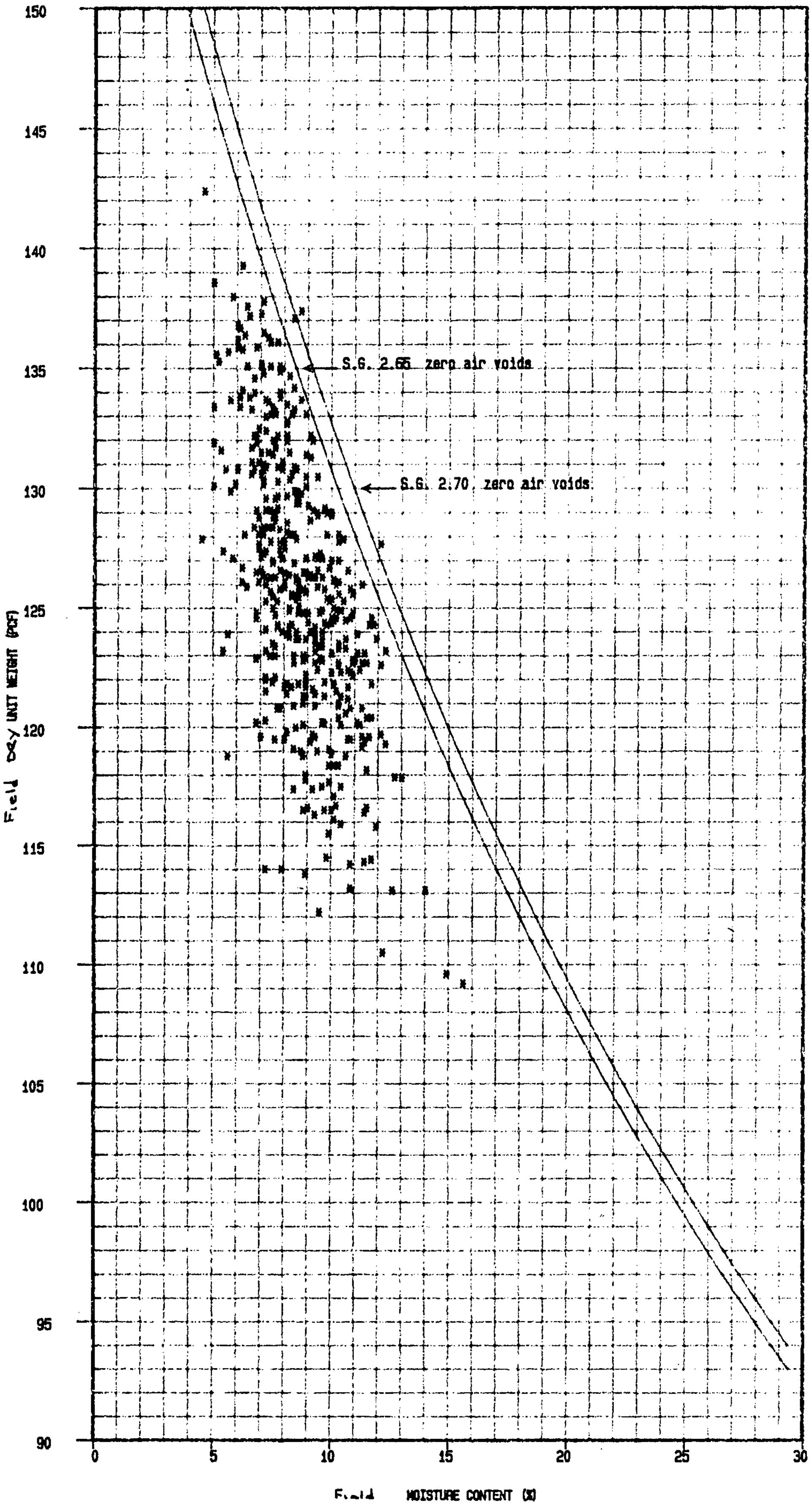
LABORATORY/OPTIMUM MOISTURE CONTENT – S-CURVE

Project LITTLE DELL DAM

Area RANDOM II

Boring No.

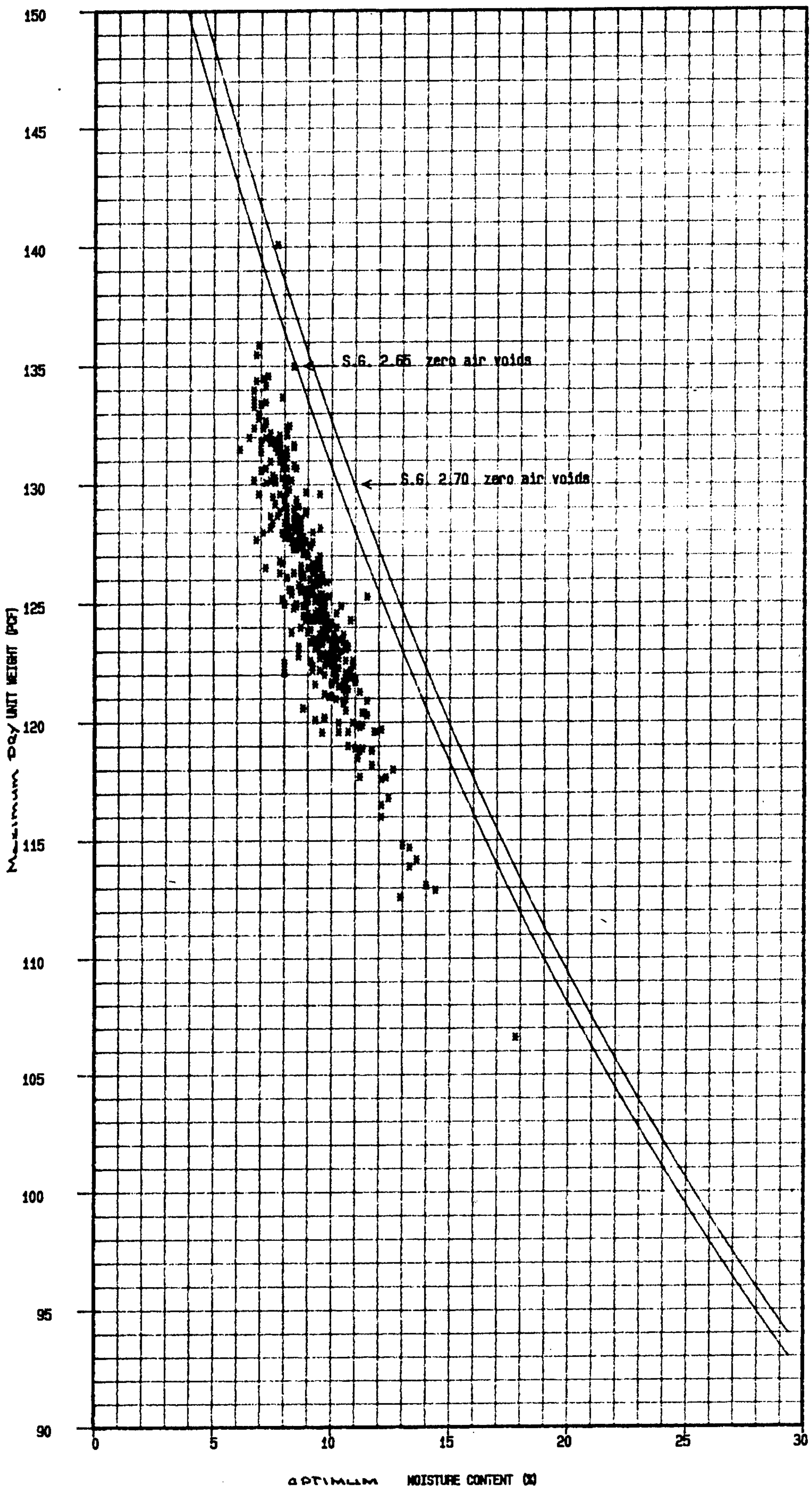
Date



IN PLACE

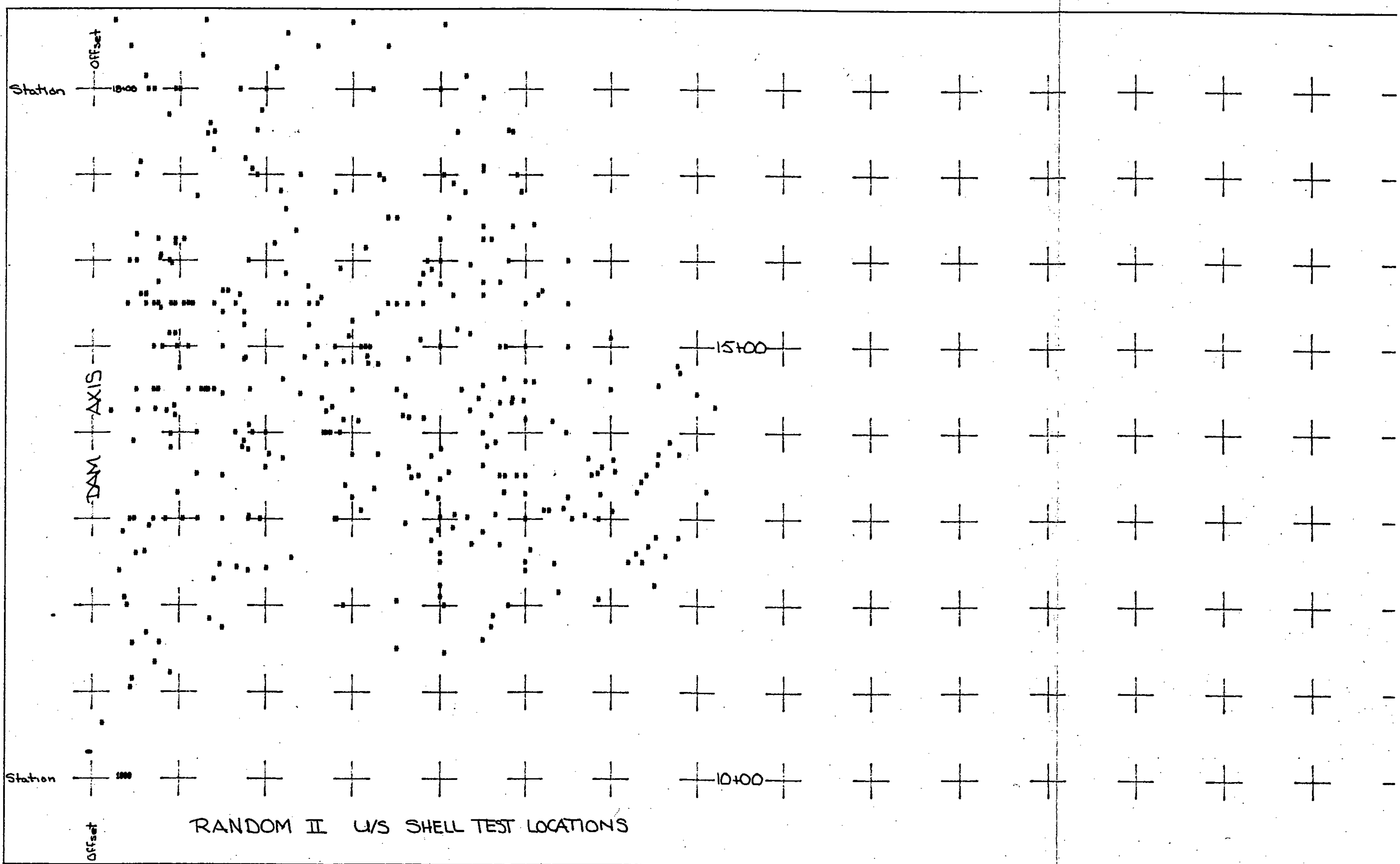
IN PLACE

RANDOM II



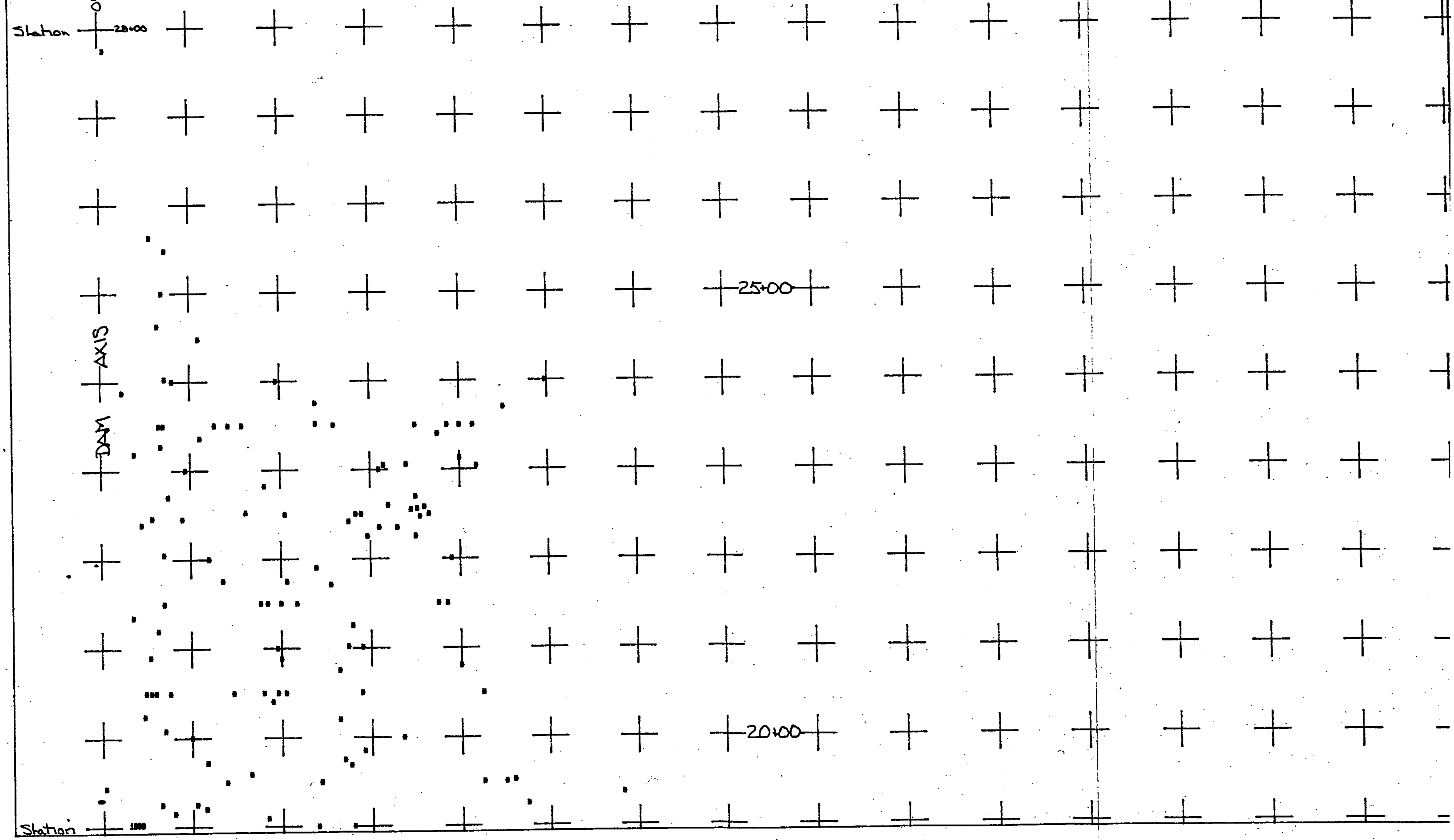
LABORATORY

RANDOM II



RANDOM II U/S SHELL TEST LOCATIONS

RANDOM II U/S. SHELL TEST LOCATIONS



APPENDIX II

FIELD CONTROL DATA, LITTLE DELL DAM

RANDOM IV
UPSTREAM SHELL

Specifications Comparison Report

Gradations Report

Compaction Report

Comments Report

Percent Compaction vs Moisture Content with respect to the Optimum Moisture Content

Field Dry Density vs Percent Compaction

Percent Compaction vs Elevation

and

Percent Moisture Content with respect to the Optimum Moisture Content vs Elevation

Gradation Curve

Plasticity Chart

S Curves

- % Cobbles
- % Gravel
- % Sand
- % Fines
- % Compaction
- Unit Weight
- Moisture Content vs Optimum Moisture Content
- Moisture Content
- Maximum Dry Density (Laboratory)
- Optimum Moisture Content (Laboratory)

Test Locals

QUALITY ACCEPTANCE TESTING - SPECIFICATIONS COMPARISON REPORT REPORT NUMBER: RIV.0

PROJECT: LITTLE DELL LAKE, DAM AND APPURTENANCES RIVER: SALT LAKE CITY STREAMS STATE: UTAH TOWN: SALT LAKE CITY	CONTRACT NO. DACW05-89-C-0045 CONTRACTOR: CLEMENT BROTHERS AND J.E. STARNES CO.	DATE OF REPORT: 12-08-92 01-01-92 THRU 12-31-92

EMBANKMENT ZONE	MIN. DESIGNED % COMP	SPEC. W.C. % RANGE	LOOSE LIFT THICK. (IN)	NUMBER OF PASSES	COMPACTION EQUIPMENT
RANDOM IV	95	-3 TO 1	8	6	CAT 825C, SP-60

TEST NUMBER	DATE	ELEV	LOCATION STATION	LOCATION OFFSET	% COBBL	% GRAV	% SAND	% FINES	% COMPACTION DESIGN >= 95%	MOISTURE IN SPEC -3 %- 1 %	GRADATION IN SPEC	GRAVELS IN SPEC > %	FINES IN SPEC < %	TEST IN SPEC	STATUS FAILED TESTS
2283	09-09-92	5769.4	1300	50	1.0	18.0	23.0	58.0	Y	Y	Y	-	-	Y	
2287	09-09-92	5766.7	2350	77	0.0	6.0	18.0	76.0	Y	Y	Y	-	-	Y	
2293	09-10-92	5771.4	1235	65	0.0	7.0	13.0	80.0	Y	Y	Y	-	-	Y	
2295	09-11-92	5771.6	1650	40	0.0	16.0	17.0	67.0	Y	Y	Y	-	-	Y	
2300	09-11-92	5772.4	2050	60	0.0	11.0	19.0	70.0	Y	Y	Y	-	-	Y	
2306	09-13-92	5775.0	1147	40	4.0	16.0	19.0	61.0	Y	Y	Y	-	-	Y	
2314	09-15-92	5776.7	2350	36	0.0	10.0	19.0	71.0	Y	Y	Y	-	-	Y	
2318	09-15-92	5780.6	1300	62	0.0	4.0	20.0	76.0	Y	Y	Y	-	-	Y	
2332	09-17-92	5776.3	2528	29	0.0	13.0	20.0	67.0	Y	Y	Y	-	-	Y	
2337	09-18-92	5785.5	1300	36	1.0	10.0	18.0	71.0	Y	Y	Y	-	-	Y	
2338	09-18-92	5786.4	1800	33	0.0	13.0	22.0	65.0	Y	Y	Y	-	-	Y	

NOTE: These statistics include only results of tests that are NOT designated as RM, RW, or RW,RT.

	% COMPACTION	MOISTURE	GRADATION	GRAVELS	FINES	TEST IN SPEC
FAILING TEST LOCATIONS	0	0	0	0	0	0
PASSING TEST LOCATIONS	11	11	11	0	0	11
TOTAL TEST LOCATIONS	11	11	11	0	0	11
% FAILING TEST LOCATIONS	0.0	0.0	0.0	0.0	0.0	0.0

REMARKS LEGEND

RM - Test Location Removed
RW - Test Loc. Reworked and NOT Retested
RW,RT - Test Loc. Reworked and Retested
AR - Additional Rolling at Test Location

TEST LOCATIONS REWORKED - UNTESTED..	0
TEST LOCATIONS REWORKED - RETESTED..	0
TEST LOCATIONS REMOVED.............	0
FAILED TEST LOCATIONS NOT REWORKED OR RETESTED..	0
PERCENT OF FAILED TEST LOCATIONS NOT REWORKED OR RETESTED IN PERMANENT FILL..	0.0

COMMENT: THIS REPORT COVERS THE ENTIRE CONSTRUCTION OF THE DAM.

LAB CHIEF: ____________________ SUBMITTED BY: ____________________
PROJECT ENGINEER

QUALITY ACCEPTANCE TESTING - GRADATIONS REPORT	REPORT NUMBER: RIV.1	

PROJECT: LITTLE DELL LAKE, DAM AND APPURTENANCES RIVER: SALT LAKE CITY STREAMS STATE: UTAH TOWN: SALT LAKE CITY	CONTRACT NO. DACW05-89-C-0045 CONTRACTOR: CLEMENT BROTHERS AND J.E. STARNES CO.	DATE OF REPORT: 12-08-92 01-01-92 THRU 12-31-92

EMBANKMENT ZONE	MIN. DESIGNED % COMP	SPEC. W.C. % RANGE	LOOSE LIFT THICK. (IN)	NUMBER OF PASSES	COMPACTION EQUIPMENT
RANDOM IV	95	-3 TO 1	8	6	CAT 825C, SP-60

TEST NUMBER	DATE	ELEV	LOCATION		GRADATION - PERCENT PASSING										LL	PI	CLASSIFICATION
			STATION	OFFSET	8 IN	3 IN	1 IN	3/4IN	3/8IN	# 4	# 10	# 40	#100	#200			
2283	09-09-92	5769.4	1300	50	100.0	99.0	92.0	90.0	85.0	81.0	77.0	74.0	69.0	58.0			SA CL WITH GR
2287	09-09-92	5766.7	2350	77	100.0	100.0	97.0	96.0	95.0	94.0	92.0	89.0	85.0	76.0			CL WITH SA
2293	09-10-92	5771.4	1235	65	100.0	100.0	98.0	98.0	94.0	93.0	91.0	89.0	87.0	80.0	49.0	31.0	CL WITH SA
2295	09-11-92	5771.6	1650	40	100.0	100.0	90.0	88.0	87.0	84.0	82.0	79.0	75.0	67.0			SA CL WITH GR
2300	09-11-92	5772.4	2050	60	100.0	100.0	95.0	94.0	92.0	89.0	87.0	84.0	79.0	70.0			SA CL
2306	09-13-92	5775.0	1147	40	100.0	96.0	89.0	87.0	83.0	80.0	77.0	73.0	68.0	61.0	41.0	23.0	SA CL W GR & CB
2314	09-15-92	5776.7	2350	36	100.0	100.0	96.0	95.0	92.0	90.0	88.0	85.0	80.0	71.0			CL WITH SA
2318	09-15-92	5780.6	1300	62	100.0	100.0	99.0	98.0	97.0	96.0	95.0	93.0	88.0	76.0			CL WITH SA
2332	09-17-92	5776.3	2528	29	100.0	100.0	97.0	95.0	90.0	87.0	85.0	81.0	76.0	67.0			SA CL
2337	09-18-92	5785.5	1300	36	100.0	99.0	94.0	93.0	91.0	89.0	87.0	83.0	79.0	71.0			CL WITH SA
2338	09-18-92	5786.4	1800	33	100.0	100.0	94.0	91.0	89.0	87.0	84.0	80.0	74.0	65.0	47.0	32.0	SA CL

NOTE - Emphasized Numbers indicate percent passing outside of gradation range specified.

COMMENT: THIS REPORT COVERS THE ENTIRE CONSTRUCTION OF THE DAM.

LAB CHIEF: ______________________

SUBMITTED BY: ______________________
PROJECT ENGINEER

QUALITY ACCEPTANCE TESTING - COMPACTION REPORT	REPORT NUMBER: RIV.2	
PROJECT: LITTLE DELL LAKE, DAM AND APPURTENANCES RIVER: SALT LAKE CITY STREAMS STATE: UTAH TOWN: SALT LAKE CITY	CONTRACT NO. DACW05-89-C-0045 CONTRACTOR: CLEMENT BROTHERS AND J.E. STARNES CO.	DATE OF REPORT: 12-08-92 01-01-92 THRU 12-31-92

EMBANKMENT ZONE	MIN. DESIGNED % COMP	SPEC. W.C. % RANGE	LOOSE LIFT THICK. (IN)	NUMBER OF PASSES	COMPACTION EQUIPMENT
RANDOM IV	95	-3 TO 1	8	6	CAT 825C, SP-60

TEST	DATE	ELEV	LOCATION		FIELD		STANDARD LAB COMPACTION			PERCENT	PERCENT	CLASSIFICATION
NUMBER			STATION	OFFSET	DRY DENS (PCF)	MC %	TEST METH	MX DRY DEN	OMC %	COMPACTION	+- OMC	
2283	09-09-92	5769.4	1300	50	118.3	12.5	4/2283	113.6	14.2	104.1	-1.7	SA CL WITH GR
2287	09-09-92	5766.7	2350	77	109.7	19.0	4/2287 6	103.4	20.2	106.1	-1.2	CL WITH SA
2293	09-10-92	5771.4	1235	65	104.3	20.4	4/2293 6	102.9	21.0	101.4	-0.6	CL WITH SA
2295	09-11-92	5771.6	1650	40	109.0	17.0	4/2295	111.4	16.7	97.8	0.3	SA CL WITH GR
2300	09-11-92	5772.4	2050	60	107.5	15.7	4/2300 6	106.0	18.0	101.4	-2.3	SA CL
2306	09-13-92	5775.0	1147	40	112.0	15.5	4/2306	109.7	15.6	102.1	-0.1	SA CL W GR & CB
2314	09-15-92	5776.7	2350	36	110.5	18.1	4/2314 6	108.6	18.0	101.7	0.1	CL WITH SA
2318	09-15-92	5780.6	1300	62	105.4	20.3	4/2318 6	103.6	19.9	101.7	0.4	CL WITH SA
2332	09-17-92	5776.3	2528	29	110.9	15.9	4/2332 6	106.7	18.7	103.9	-2.8	SA CL
2337	09-18-92	5785.5	1300	36	111.4	17.5	4/2337 6	106.9	18.6	104.2	-1.1	CL WITH SA
2338	09-18-92	5786.4	1800	33	113.5	17.4	4/2338 6	110.2	16.6	103.0	0.8	SA CL

NOTE: Explanation of Column Headed TEST METH - 5/110 6

This indicates lab comparison type
- 5 - 5 point proctor
- 1 or 2 - 1 or 2 point proctor
- H - historical proctor

All mold diameters are 12 inch unless noted here.

proctor number used for comparison to field data

IN-PLACE - TEST RANGES FOR TESTS IN EMBANKMENT FOR THIS REPORT

FIELD DRY DENSITY	MIN	104.3	FIELD M.C.	MIN	12.5	AVGERAGE PERCENT COMPACTION THIS REPORT	102.5
FIELD DRY DENSITY	MAX	118.3	FIELD M.C.	MAX	20.4	PERCENT COMPACTIONS <95% AND >93% THIS REPORT	0.0
FIELD DRY DENSITY	AVG	110.2	FIELD M.C.	AVG	17.2	PERCENT COMPACTIONS <93% THIS REPORT	0.0

LAB - CUMULATIVE 3,4,5 POINT PROCTOR RANGE - ALL TESTS TO 12-31-92

MAX. DRY DENSITY	MIN	102.9	O.M.C.	MIN	14.2	AVERAGE PERCENT COMPACTION TO 12-31-92	102.5
MAX. DRY DENSITY	MAX	113.6	O.M.C.	MAX	21.0	PERCENT COMPACTIONS <95% AND >93% TO 12-31-92	0.0
MAX. DRY DENSITY	AVG	107.2	O.M.C.	AVG	18.1	PERCENT COMPACTIONS <93% TO 12-31-92	0.0

COMMENT: THIS REPORT COVERS THE ENTIRE CONSTRUCTION OF THE DAM.

LAB CHIEF: ____________________ SUBMITTED BY: ____________________
PROJECT ENGINEER

QUALITY ACCEPTANCE TESTING - COMMENTS REPORT	REPORT NUMBER: RIV.3	PAGE 1 OF 1
PROJECT: LITTLE DELL LAKE, DAM AND APPURTENANCES RIVER: SALT LAKE CITY STREAMS STATE: UTAH TOWN: SALT LAKE CITY	CONTRACT NO. DACW05-89-C-0045 CONTRACTOR: CLEMENT BROTHERS AND J.E. STARNES CO.	DATE OF REPORT: 12-08-92 01-01-92 THRU 12-31-92

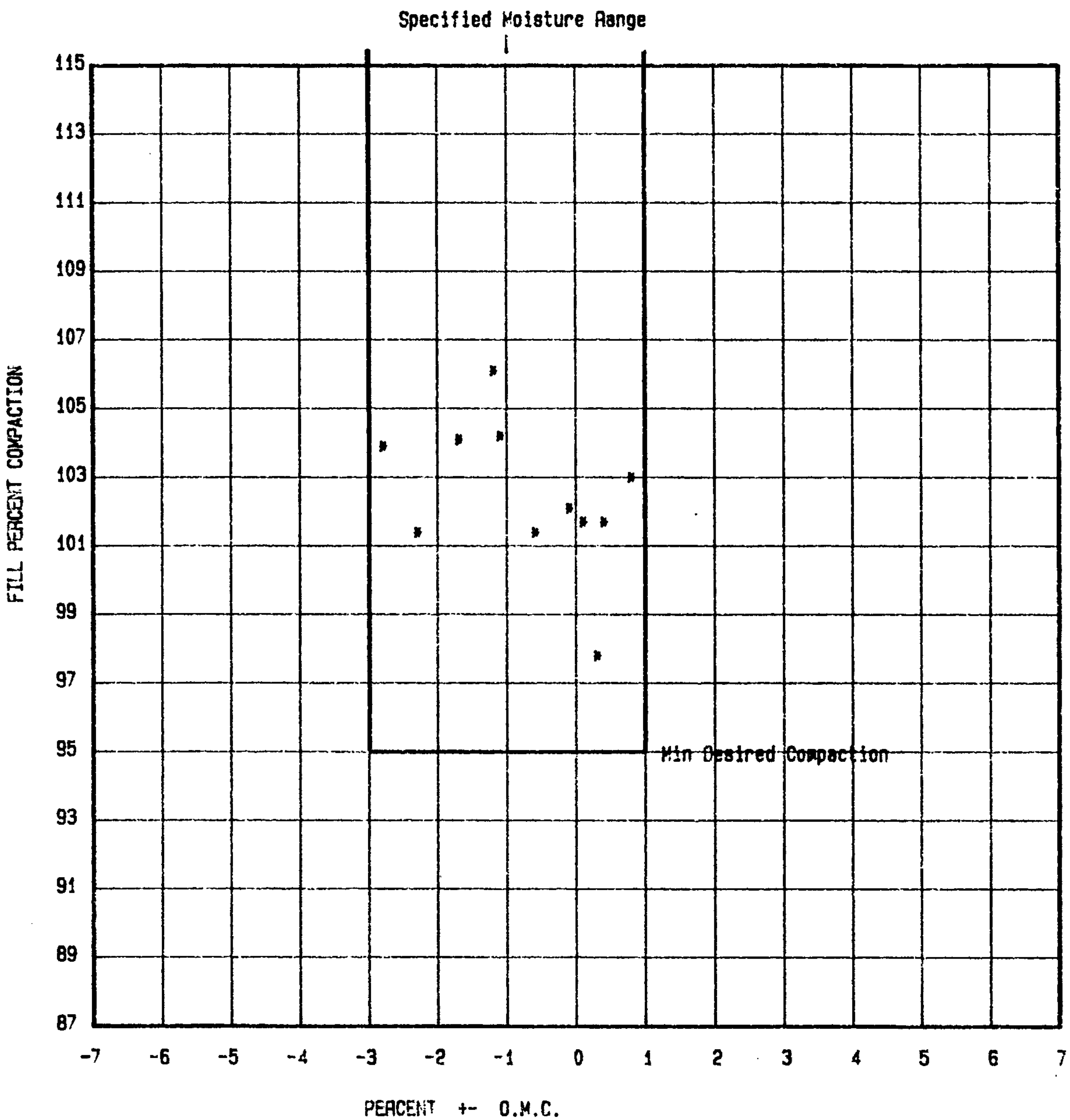
EMBANKMENT ZONE	MIN. DESIGNED % COMP	SPEC. W.C. % RANGE	LOOSE LIFT THICK. (IN)	NUMBER OF PASSES	COMPACTION EQUIPMENT
RANDOM IV	95	-3 TO 1	8	6	CAT 825C, SP-60

TEST NUMBER	TEST IN SPEC	STATUS FAILED TESTS	TEST COMMENTS
2283	Y		SOURCE-RBA 5100,200 LFT. DENS.GRAD.PROC. FIRST R IV. FIRST PLACEMENT 09-08-92 END OF DAY SHIFT.
2287	Y		SOURCE-RBA. DENS.GRAD.PROC.
2293	Y		SOURCE-RBA. DENS.GRAD.PROC. AREA 1100 TO 2400,18 TO 86.
2295	Y		SOURCE-RBA 5500 TO 5700. DENS.GRAD.PROC.
2300	Y		SOURCE-RBA. DENS.GRAD.PROC.
2306	Y		SOURCE-RBA. DENS.GRAD.PROC.
2314	Y		SOURCE-RBA. DENS.GRAD.PROC.
2318	Y		SOURCE-RBA & EXTENDED BORROW AREA MIX. DENS.GRAD.PROC.
2332	Y		SOURCE-RBA. DENS.GRAD.PROC.
2337	Y		SOURCE-RBA. DENS.GRAD.PROC.
2338	Y		SOURCE-RBA 6900. DENS.GRAD.PROC.

COMMENT: THIS REPORT COVERS THE ENTIRE CONSTRUCTION OF THE DAM.

LAB CHIEF: ____________________

SUBMITTED BY: ____________________
PROJECT ENGINEER

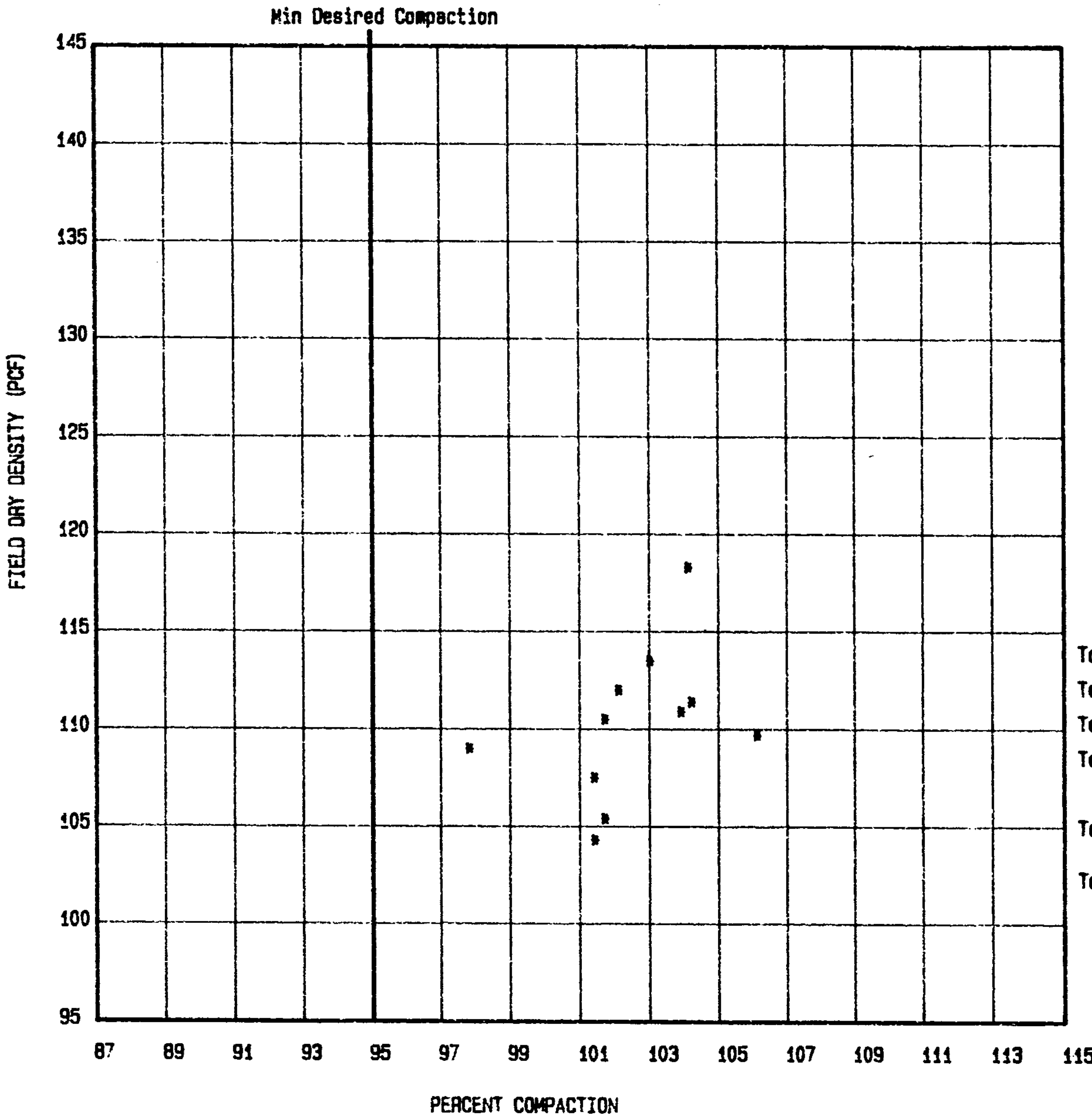


PROJECT: LITTLE DELL LAKE, DAM AND APP.
DISTRICT: CESPK
DATE OF REPORT : 12-08-1992
REPORT PERIOD : 01-01-92 thru 12-31-92
REPORT NUMBER : RIV.4
TYPE OF MATERIAL: RANDOM IV

LEGEND

* - Test within Specifications
+ - Test is out of Specification
RW - Test Location Reworked - No Retest
RW,RT - Test Location Reworked and Retested
RM - Test Location Removed

	All Tests to Date	Tests this Report
Total Number of Tests Locs.	11	11
Test Locations Reworked Only	0	0
Test Loc. Reworked and Retested	0	0
Test Locations Removed	0	0
Tests Outside Specifications in Permanent Fill		
Total Out of Spec.	0	0
Total Out on M.C.	0	0
Total Out on % Comp.	0	0
Total Out on M.C. and % Comp.	0	0

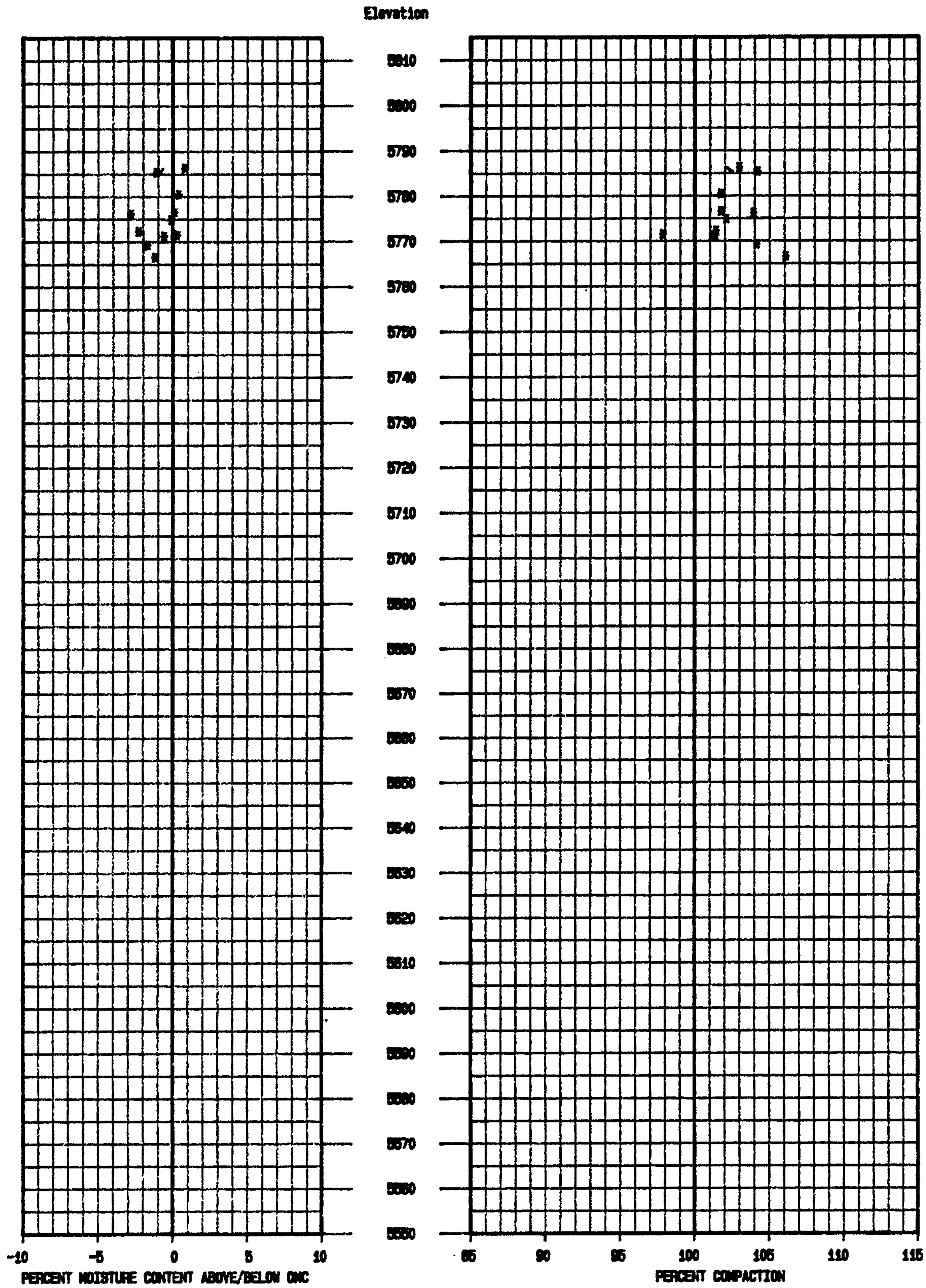


PROJECT: LITTLE DELL LAKE, DAM AND APP.
DISTRICT: CESPK
DATE OF REPORT : 12-08-1992
REPORT PERIOD : 01-01-92 thru 12-31-92
REPORT NUMBER : RIV.5
TYPE OF MATERIAL: RANDOM IV

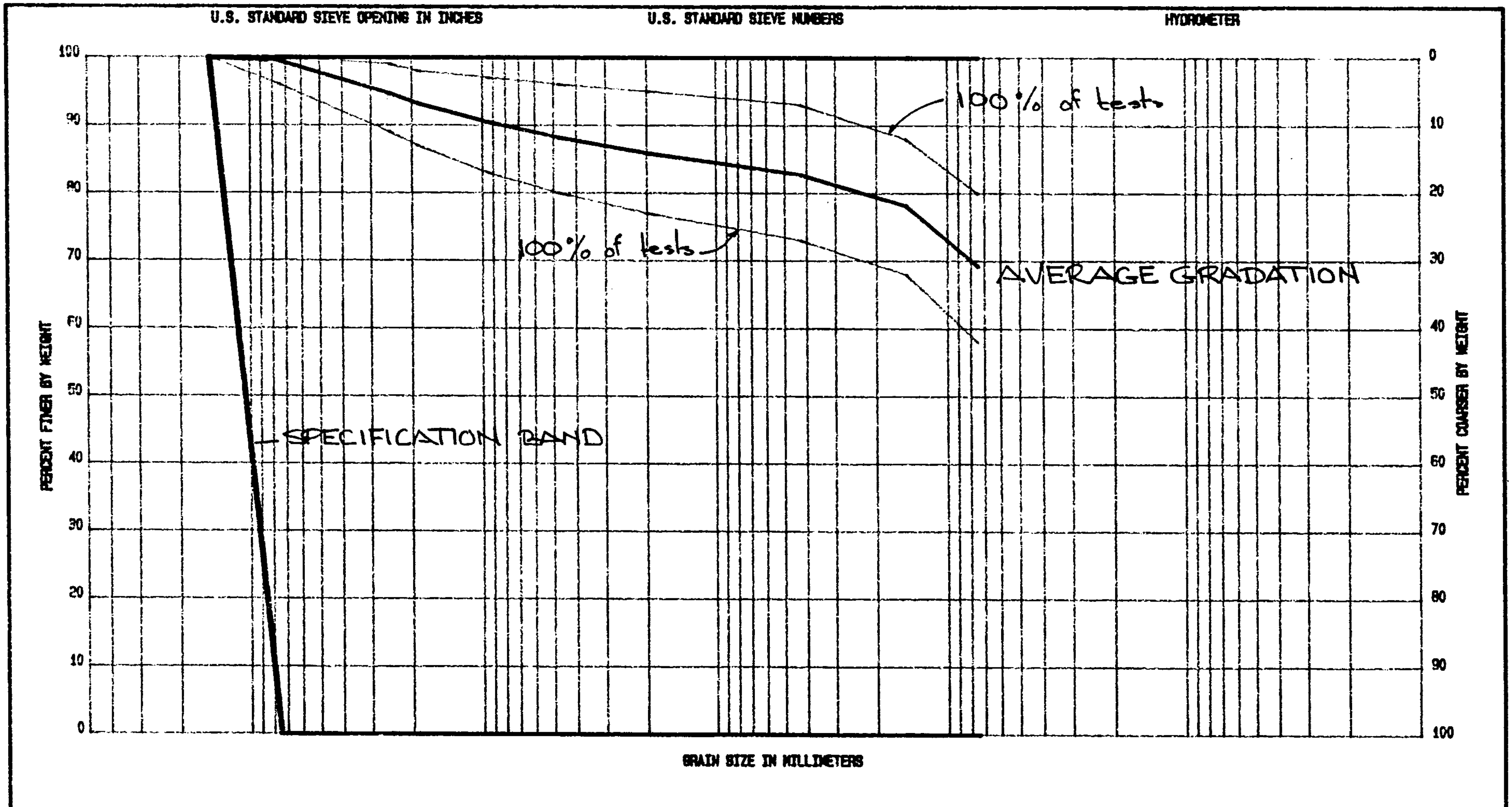
LEGEND

* - Test within Desired Limits
\+ - Test is out of Desired Limits
RW - Test Location Reworked - No Retest
RW,RT - Test Location Reworked and Retested
RM - Test Location Removed

	All Tests to Date	Tests this Report
Total Number of Tests Locs.	11	11
Test Locations Reworked Only	0	0
Test Loc. Reworked and Retested	0	0
Test Locations Removed	0	0
Tests Below Desired Compaction Limits in Fill		
Total Out of % Comp.	0	0


Elevation
5810
5800
5790
5780
5770
5760
5750
5740
5730
5720
5710
5700
5690
5680
5670
5660
5650
5640
5630
5620
5610
5600
5590
5580
5570
5560
5550
-10
-5
0
5
10
PERCENT MOISTURE CONTENT ABOVE/BELOW OMC
85
90
95
100
105
110
115
PERCENT COMPACTION

RANDOM IV



Represents material placed between Elev 5665 and 5690.

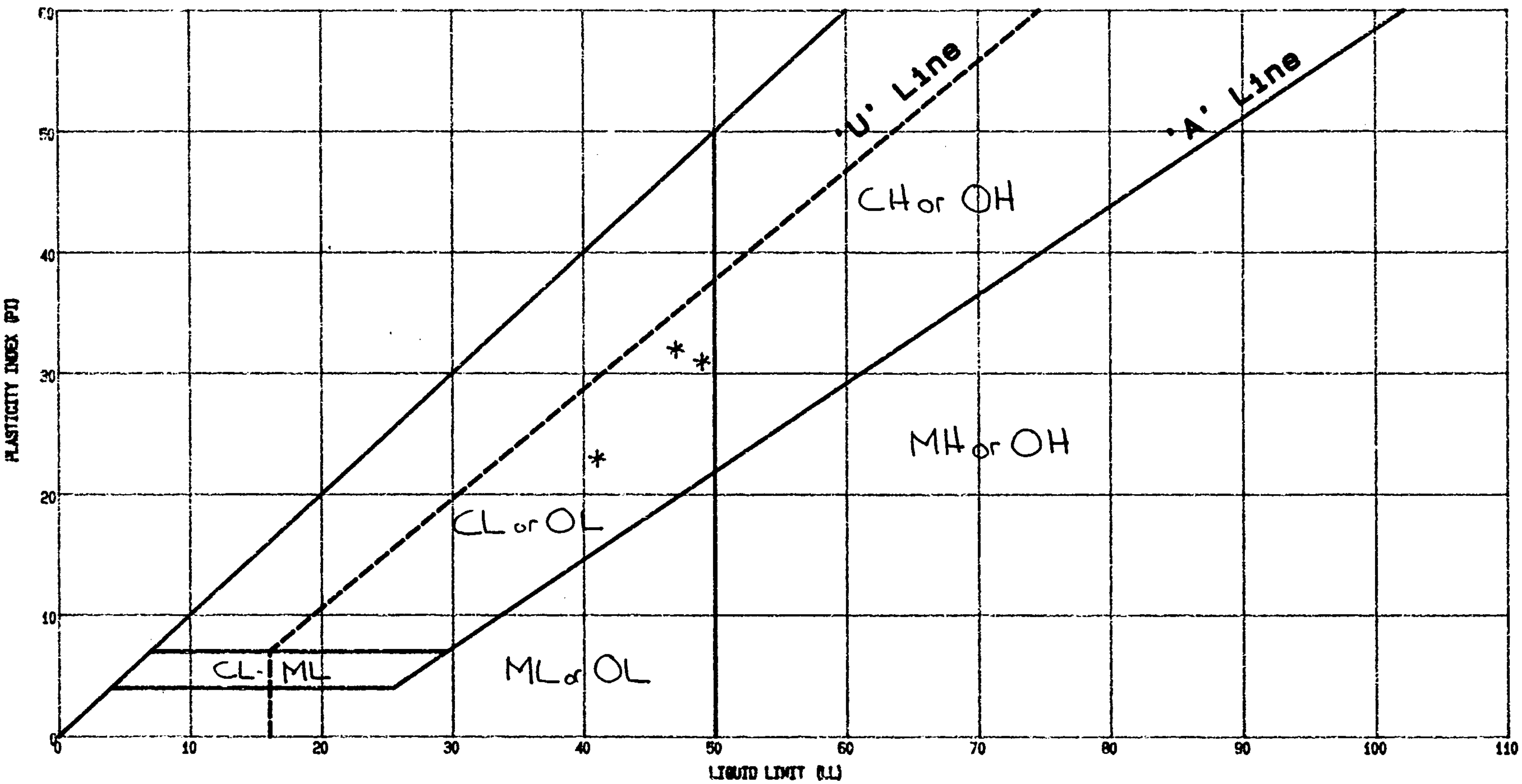
GRADATION CURVES

Project **LITTLE DELL DAM**

Area **RANDOM IV**

Boring No.

Date



Represents all test data

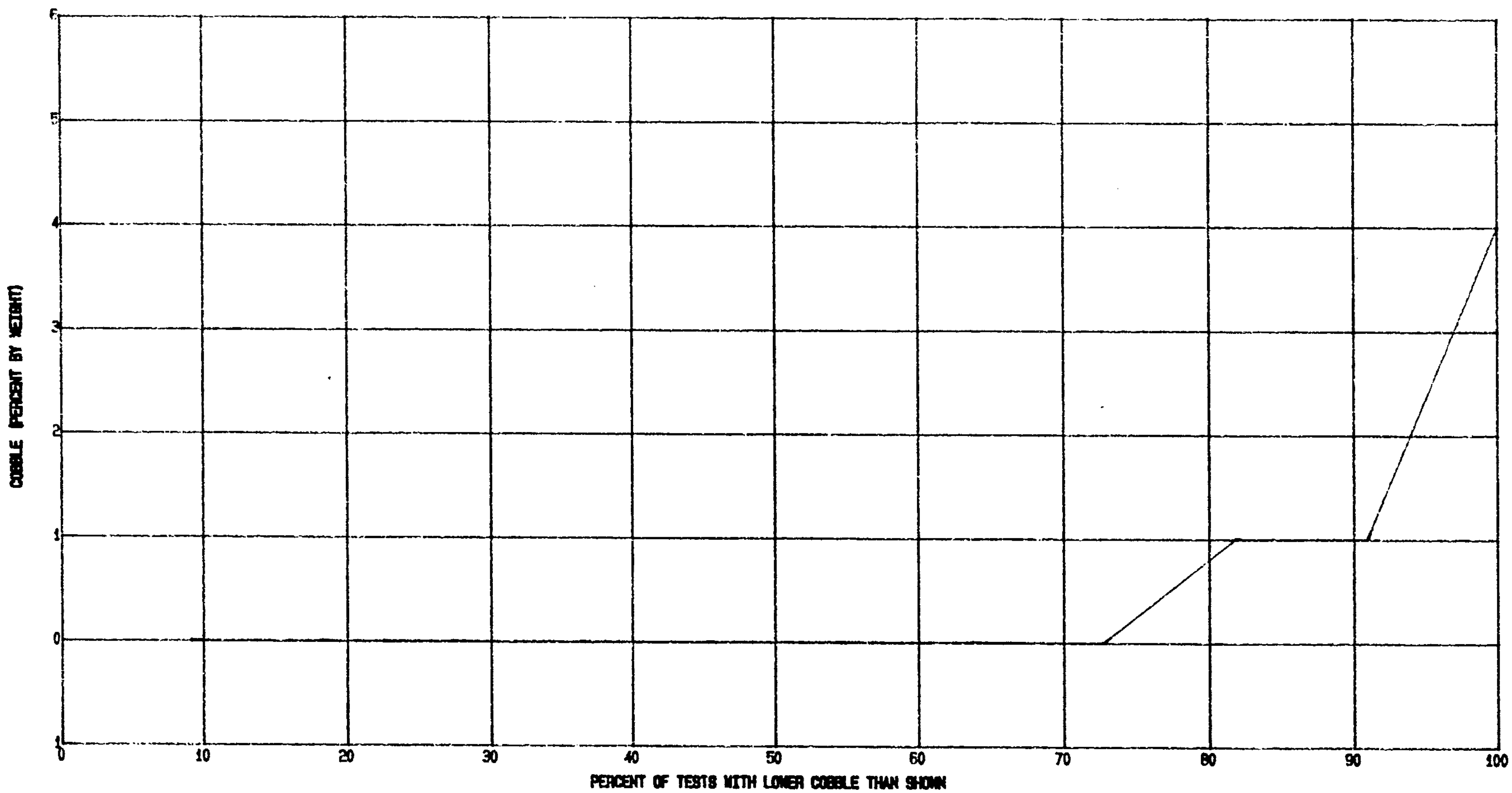
PLASTICITY CHART

Project LITTLE DELL DAM

Area RANDOM IV

Boring No.

Date



Line Style	From Date	To Date	# Points	Mean	Std Dev	10 %	Median	90 %
	01-01-82	12-31-82	11	.5454546	1.21356	0	0	1

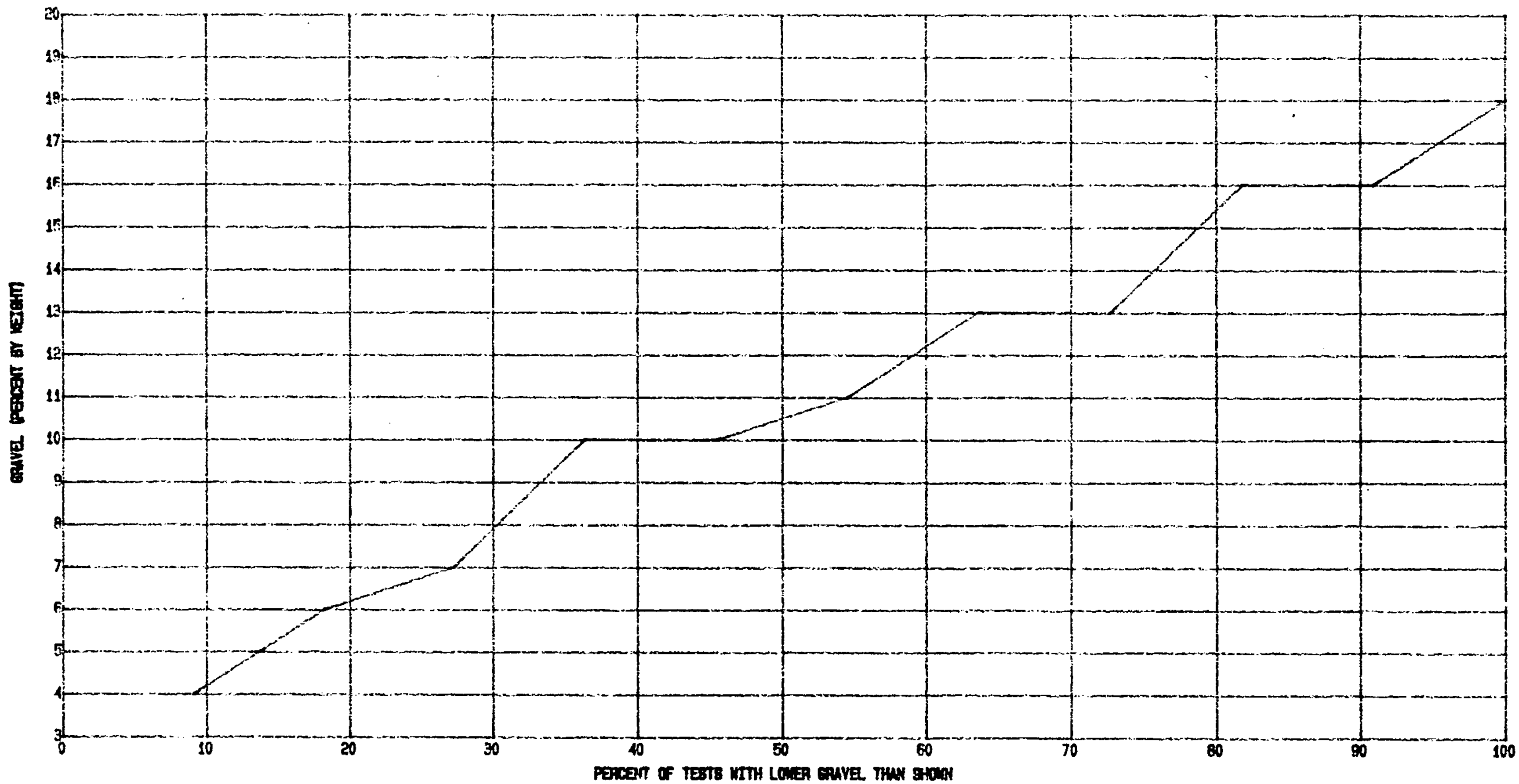
Project LITTLE DELL DAM

Area RANDOM IV

Boring No.

Date

COBBLE - S-CURVE



Line Style	From Date	To Date	# Points	Mean	Std Dev	10 %	Median	90 %
	01-01-92	12-31-92	11	11.27273	4.451762	4	10	16

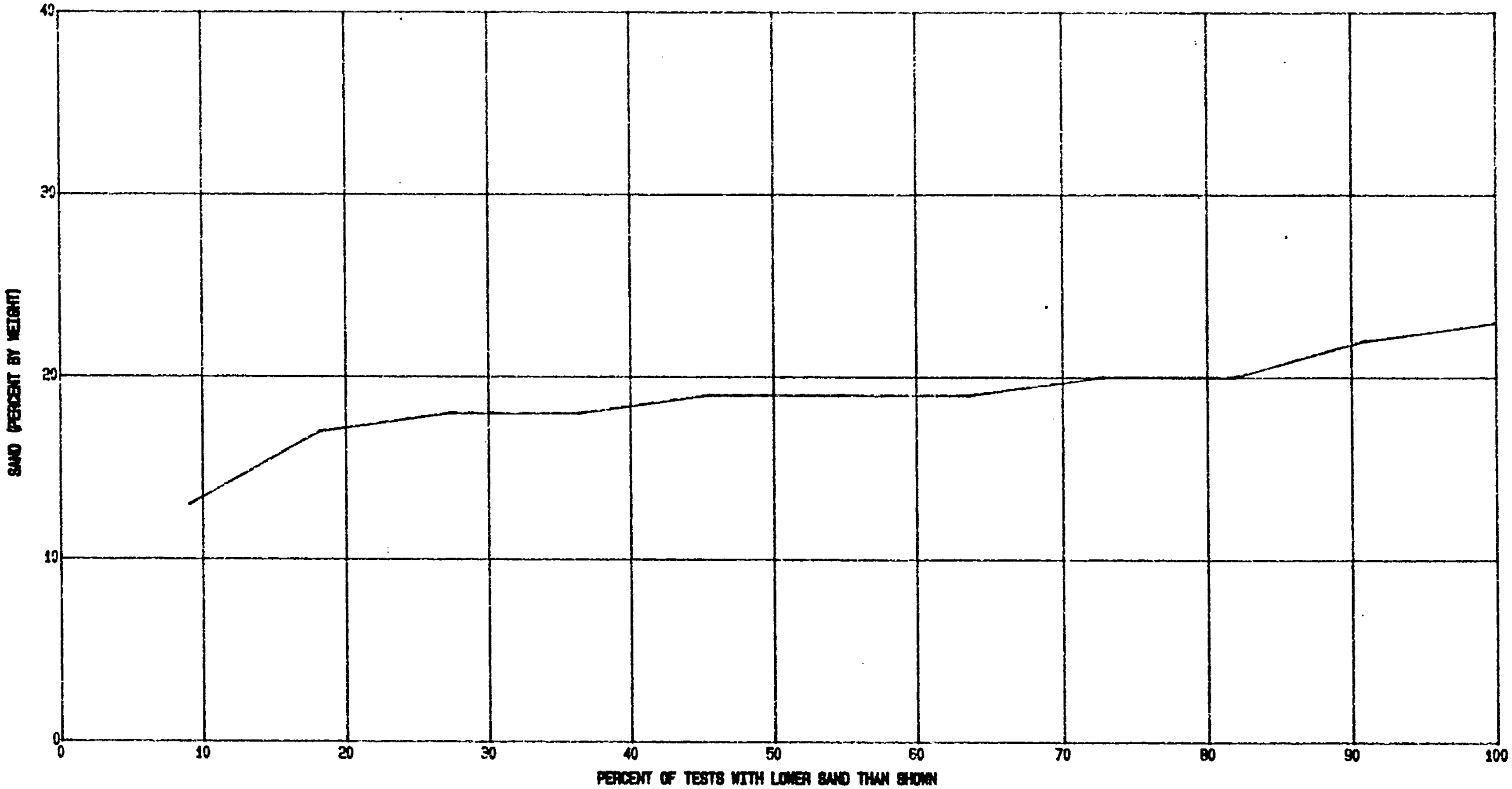
GRAVEL - S-CURVE

Project LITTLE DELL DAM

Area RANDOM IV

Boring No.

Date



Line Style	From Date	To Date	# Points	Mean	Std Dev	10 %	Median	90 %
	01-01-92	12-31-92	11	18.90909	2.625054	13	19	20

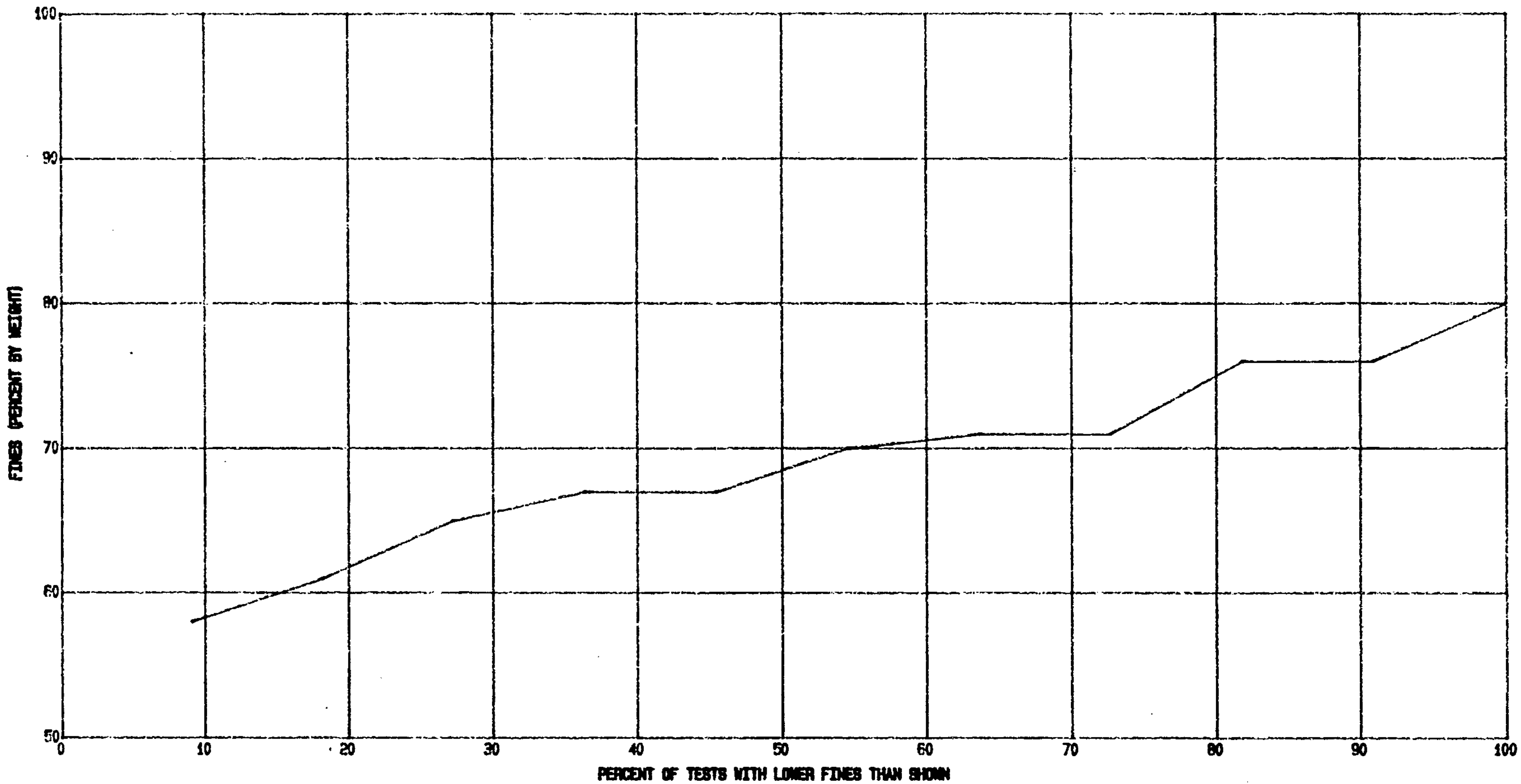
SAND - S-CURVE

Project LITTLE DELL DAM

Area RANDOM IV

Boring No.

Date



Line Style	From Date	To Date	# Points	Mean	Std Dev	10 %	Median	90 %
	01-01-92	12-31-92	11	69.27273	6.604406	58	67	76

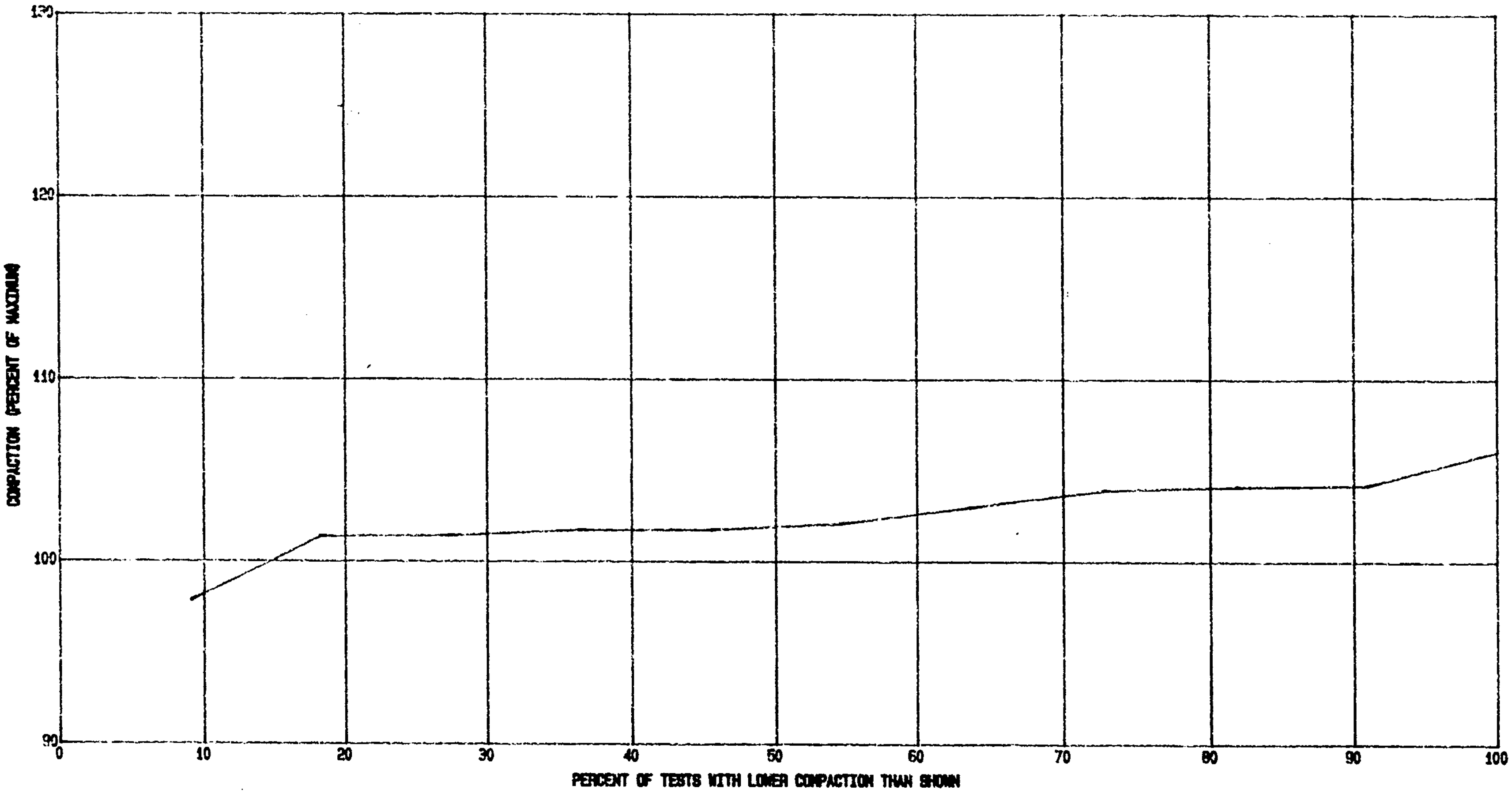
FINES - S-CURVE

Project LITTLE DELL DAM

Area RANDOM IV

Boring No.

Date



Line Style	From Date	To Date	# Points	Mean	Std Dev	10 %	Median	90 %
	01-01-92	12-31-92	11	102.5069	2.150473	97.8466	101.7495	104.1373

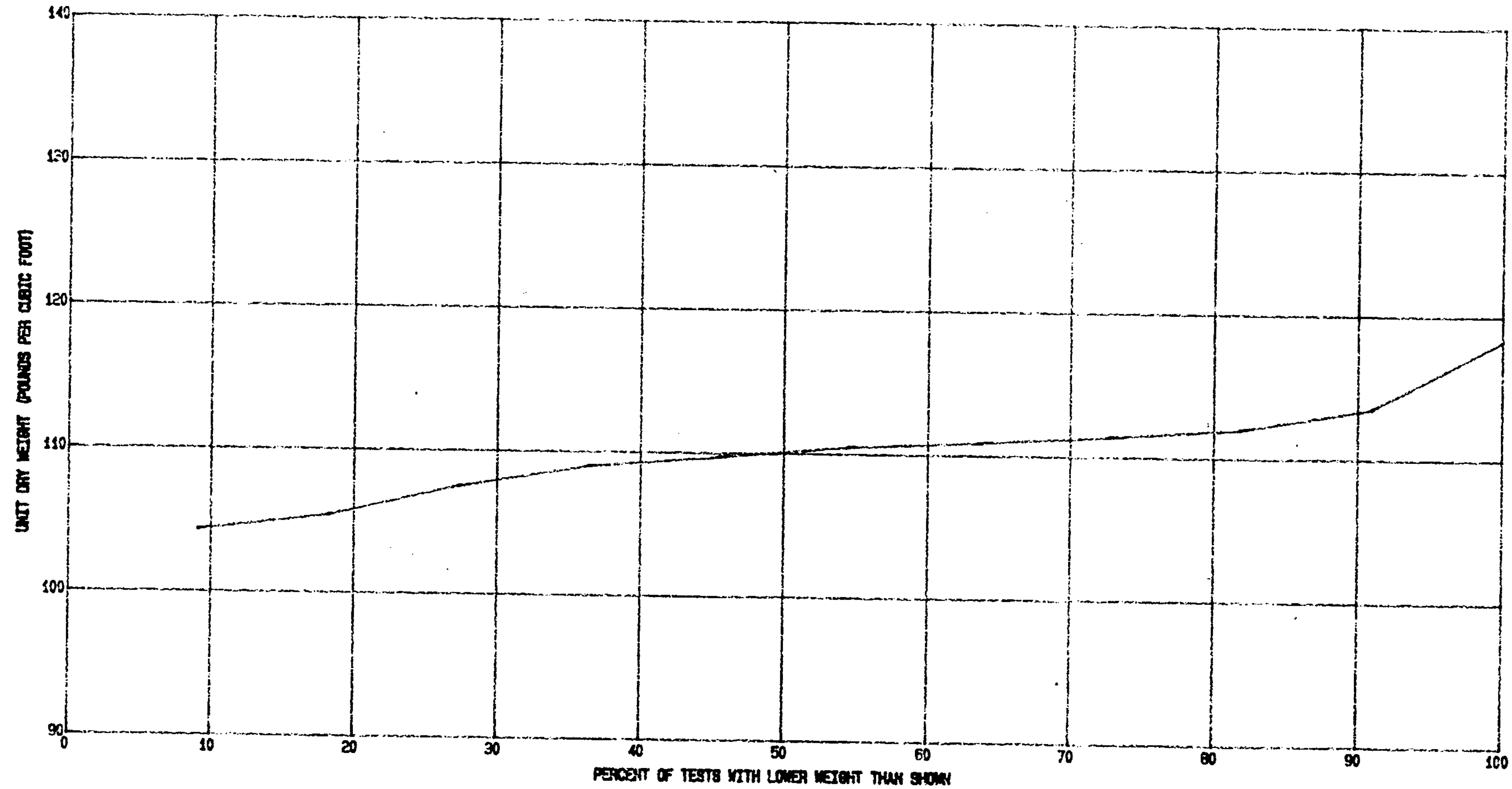
Project LITTLE DELL DAM

Area RANDOM IV

Boring No.

Date

IN PLACE COMPACTION - S-CURVE



Line Style	From Date	To Date	# Points	Mean	Std Dev	10 %	Median	90 %
	01-01-92	12-31-92	11	110.2273	3.854363	104.3	109.7	112

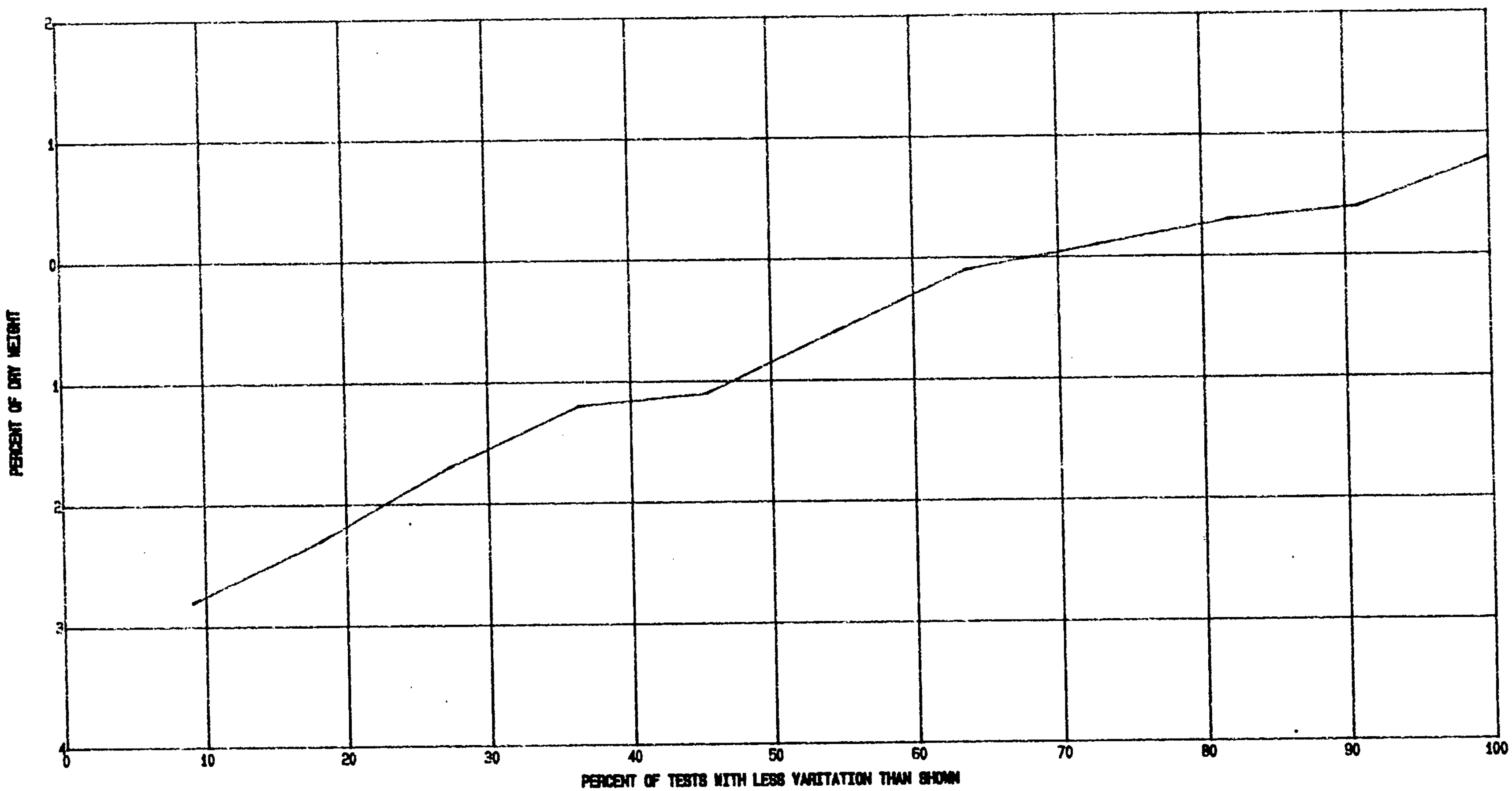
IN PLACE UNIT WEIGHT - S-CURVE

Project LITTLE DELL DAM

Area RANDOM IV

Boring No.

Date



Line Style	From Date	To Date	# Points	Mean	Std Dev	10 %	Median	90 %
	01-01-92	12-31-92	11	-.7454546	1.175884	-2.8	-1.1	.3

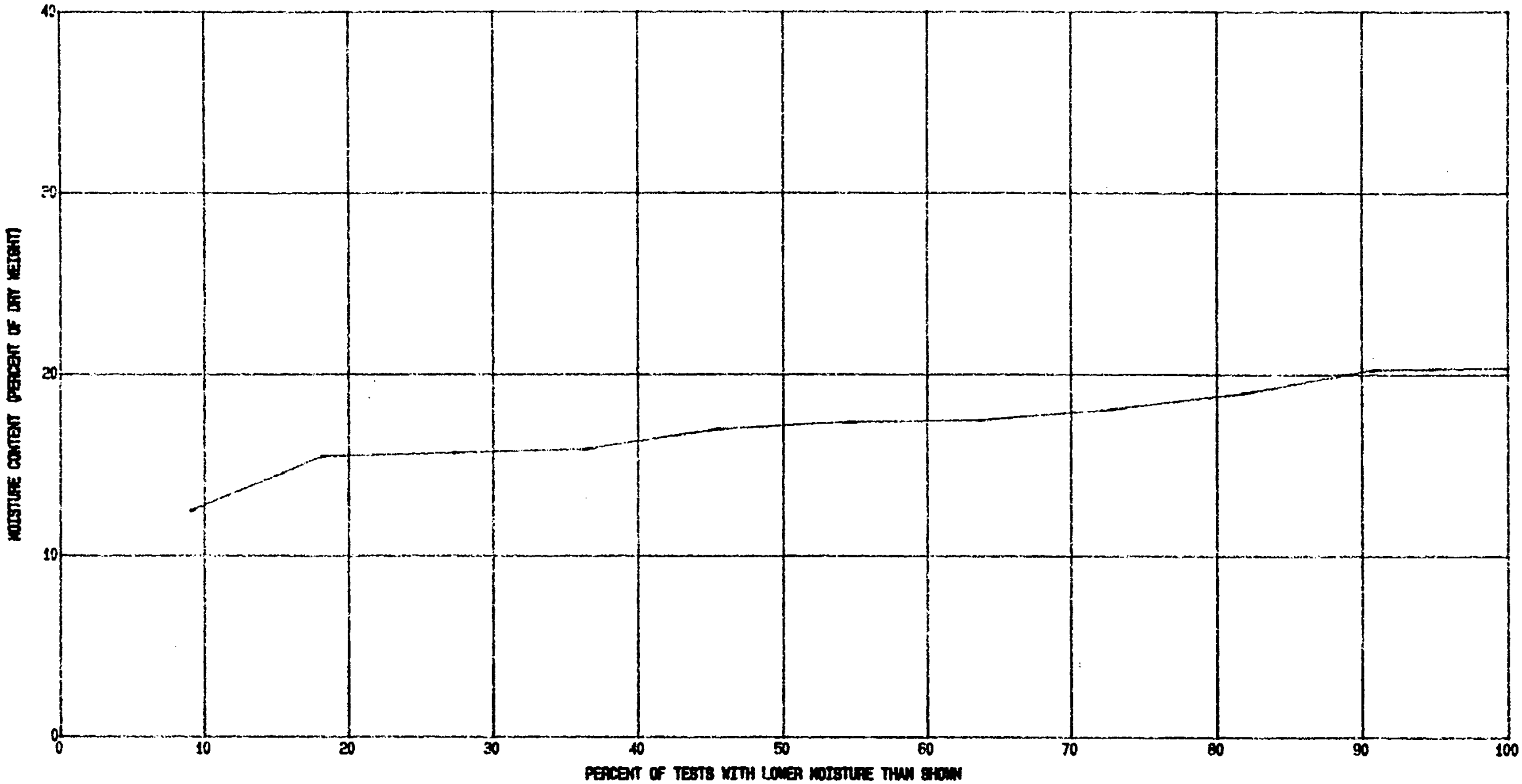
OMC COMPARISON - S-CURVE

Project LITTLE DELL DAM

Area RANDOM IV

Boring No.

Date



Line Style	From Date	To Date	# Points	Mean	Std Dev	10 %	Median	90 %
	01-01-92	12-31-92	11	17.20909	2.301937	12.5	17	19

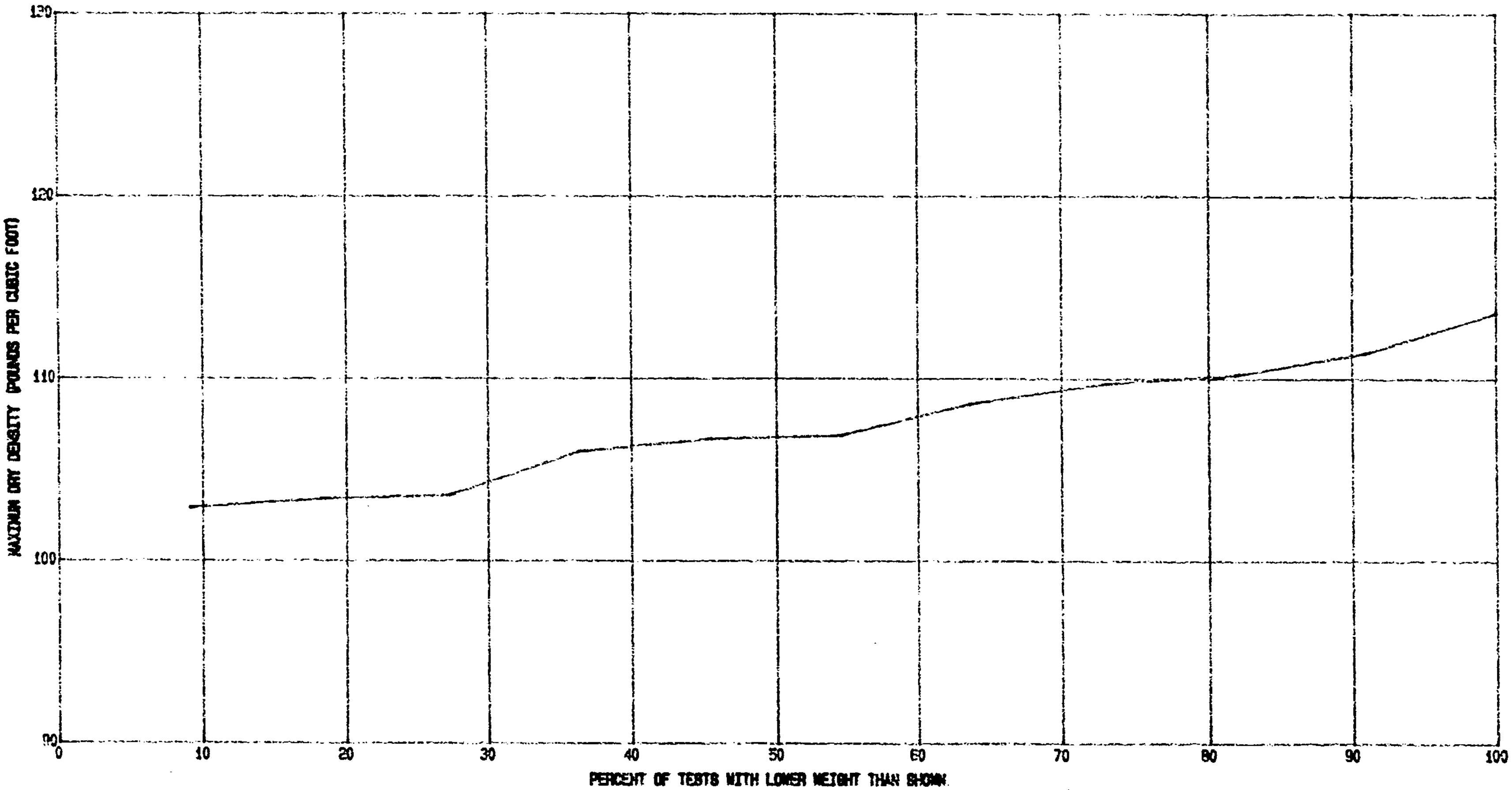
MOISTURE CONTENT - S-CURVE

Project LITTLE DELL DAM

Area RANDOM IV

Boring No.

Date



Line Style	From Date	To Date	# Points	Mean	Std Dev	10 %	Median	90 %
	01-01-92	12-31-92	11	107.5455	3.495208	102.9	106.7	110.2

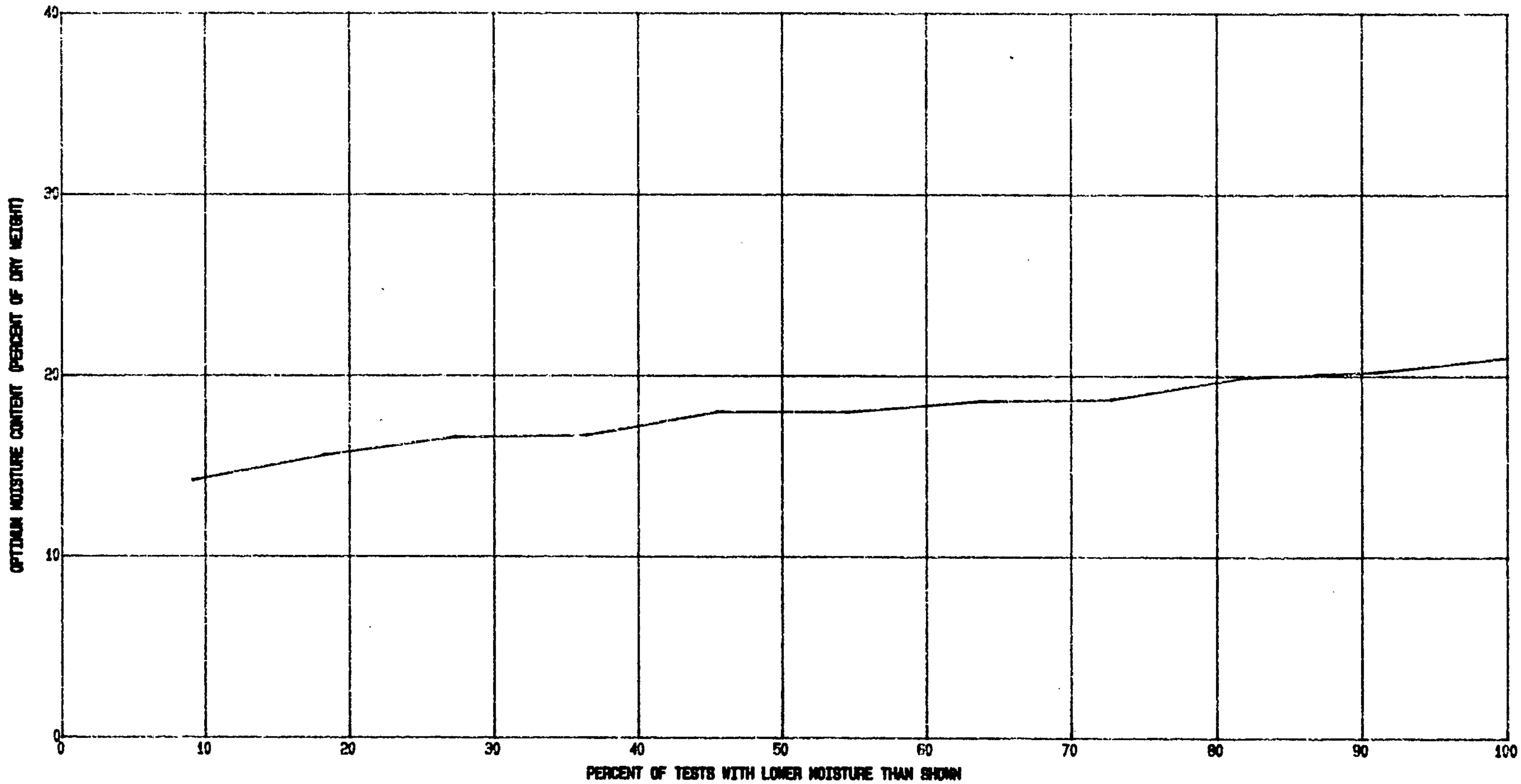
Project LITTLE DELL DAM

Area RANDOM IV

Boring No.

Date

LABORATORY MAX. DRY DENSITY - S-CURVE



Line Style	From Date	To Date	# Points	Mean	Std Dev	10 %	Median	90 %
	01-01-92	12-31-92	11	17.95455	2.05249	14.2	18	19.9

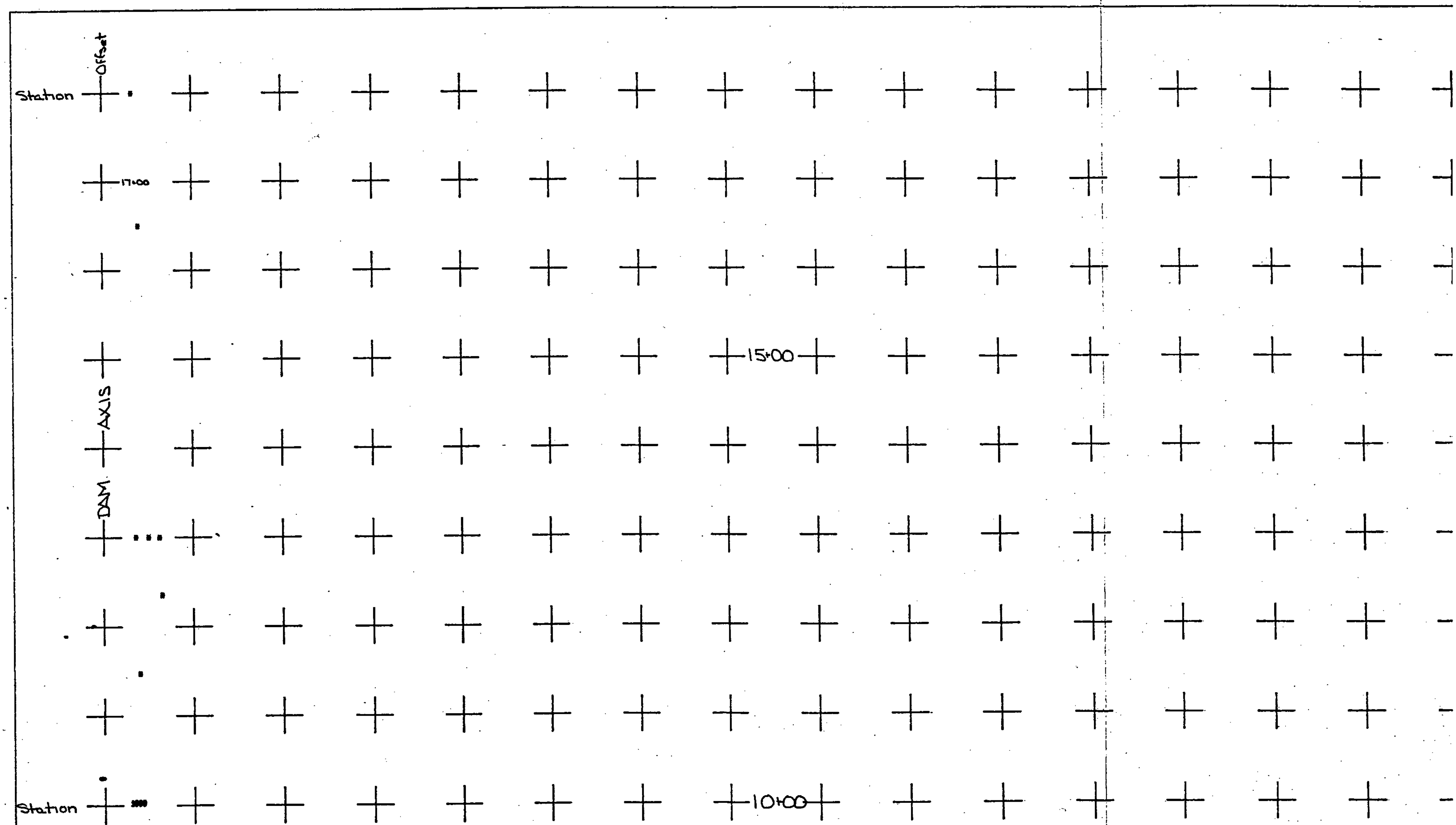
Project LITTLE DELL DAM

Area RANDOM IV

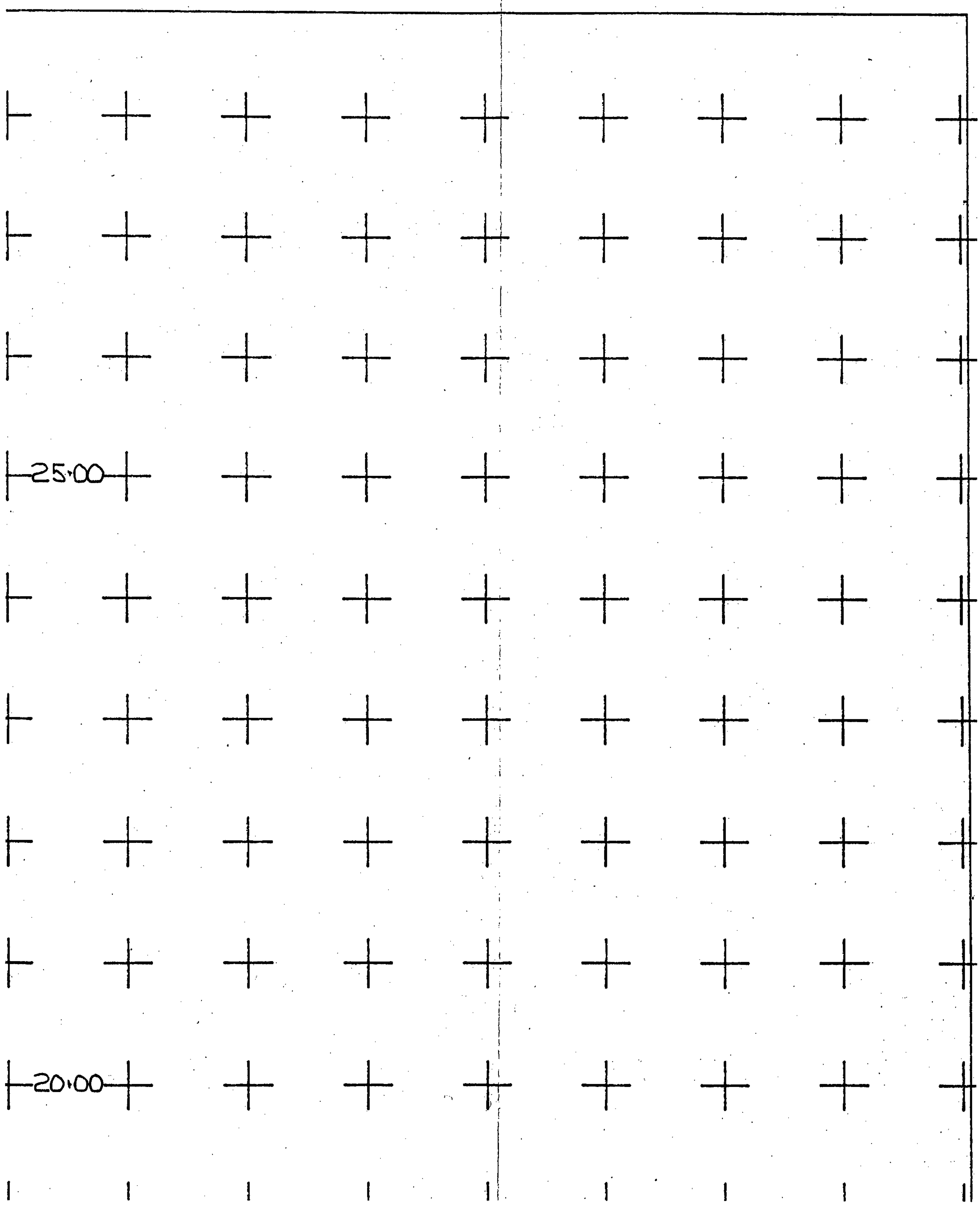
Boring No.

Date

LABORATORY OPTIMUM MOISTURE CONTENT - S-CURVE



RANDOM IV U/S SHELL TEST LOCATIONS


25.00
20.00

APPENDIX II

FIELD CONTROL DATA, LITTLE DELL DAM

IMPERVIOUS CORE

Specifications Comparison Report

Gradations Report

Compaction Report

Comments Report

Percent Compaction vs Moisture Content with respect to the Optimum Moisture Content

Field Dry Density vs Percent Compaction

Percent Compaction vs Elevation

and

Percent Moisture Content with respect to the Optimum Moisture Content vs Elevation

Gradation Curves

Plasticity Charts

S Curves

- % Cobbles
- % Gravel
- % Sand
- % Fines
- % Compaction
- Unit Weight
- Moisture Content vs Optimum Moisture Content
- Moisture Content
- Maximum Dry Density (Laboratory)
- Optimum Moisture Content (Laboratory)

Sand Cone/In Place Dry Unit Weight vs Moisture Content

Laboratory Maximum Dry Unit Weight vs Optimum Moisture Content

Test Locals

QUALITY ACCEPTANCE TESTING - SPECIFICATIONS COMPARISON REPORT

REPORT NUMBER: IC.0

PROJECT: LITTLE DELL LAKE, DAM AND APPURTENANCES RIVER: SALT LAKE CITY STREAMS STATE: UTAH TOWN: SALT LAKE CITY	CONTRACT NO. DACW05-89-C-0045 CONTRACTOR: CLEMENT BROTHERS AND J.E. STARNES CO.	DATE OF REPORT: 12-08-92 01-01-90 THRU 12-31-92

EMBANKMENT ZONE	MIN. DESIGNED % COMP	SPEC. W.C. % RANGE	LOOSE LIFT THICK. (IN)	NUMBER OF PASSES	COMPACTION EQUIPMENT
IMPERVIOUS	95	-3 TO 1	8	6	CAT 825C, 980, 950

TEST NUMBER	DATE	ELEV	LOCATION		% COBBL	% GRAV	% SAND	% FINES	% COMPACTION DESIGN >= 95%	MOISTURE IN SPEC -3 %- 1 %	GRADATION IN SPEC	GRAVELS IN SPEC > %	FINES IN SPEC < %	TEST IN SPEC	STATUS FAILED TESTS
			STATION	OFFSET											
478	09-22-90	5576.5	1503	-1	0.0	2.0	13.0	85.0	Y	Y	Y	-	-	Y	
481	09-24-90	5576.8	1587	-9	0.0	1.0	16.0	83.0	Y	Y	Y	-	-	Y	
485	09-25-90	5579.3	1570	27	0.0	1.0	14.0	85.0	Y	Y	Y	-	-	Y	
488	09-26-90	5579.0	1420	41	0.0	1.0	13.0	86.0	Y	Y	Y	-	-	Y	
492	09-27-90	5579.5	1600	5	0.0	2.0	13.0	85.0	Y	Y	Y	-	-	Y	
495	09-29-90	5580.0	1478	29	0.0	8.0	15.0	77.0	Y	Y	Y	-	-	Y	
502	10-02-90	5581.8	1550	40	0.0	5.0	14.0	81.0	Y	Y	Y	-	-	Y	
505	10-03-90	5579.3	1620	-15	0.0	3.0	14.0	83.0	Y	Y	Y	-	-	Y	
513	10-04-90	5582.0	1525	-10	0.0	4.0	12.0	84.0	Y	Y	Y	-	-	Y	
514	10-05-90	5580.6	1580	-15	0.0	2.0	12.0	86.0	Y	N	Y	-	-	N	OLM
518	10-09-90	5580.5	1500	-25	0.0	7.0	13.0	80.0	Y	Y	Y	-	-	Y	
537	10-13-90	5582.5	1568	12	0.0	8.0	10.0	82.0	Y	Y	Y	-	-	Y	
540	10-15-90	5583.5	1586	2	0.0	5.0	13.0	82.0	Y	N	Y	-	-	N	OLM
547	10-17-90	5586.0	1672	35	0.0	2.0	16.0	82.0	N	N	Y	-	-	N	RW
549	10-18-90	5589.6	1380	14	0.0	1.0	11.0	88.0	Y	N	Y	-	-	N	OLM
566	10-25-90	5586.0	1750	25	0.0	1.0	11.0	88.0	Y	N	Y	-	-	N	OLM
568	10-25-90	5587.0	1500	26	0.0	0.0	9.0	91.0	Y	Y	Y	-	-	Y	
570	10-26-90	5586.1	1525	-30	0.0	0.0	5.0	95.0	Y	Y	Y	-	-	Y	
587	10-29-90	5586.6	1475	10	0.0	5.0	17.0	78.0	Y	Y	Y	-	-	Y	
867	07-04-91	5588.0	1600	0	0.0	1.0	13.0	86.0	Y	N	Y	-	-	N	OLM
869	07-04-91	5589.0	1650	0	0.0	6.0	22.0	72.0	Y	Y	Y	-	-	Y	
874	07-08-91	5589.9	1400	0	0.0	12.0	20.0	68.0	Y	Y	Y	-	-	Y	
880	07-09-91	5591.2	1500	0	0.0	2.0	26.0	72.0	Y	Y	Y	-	-	Y	
881	07-09-91	5593.8	1875	0	0.0	1.0	10.0	89.0	Y	Y	Y	-	-	Y	
889	07-10-91	5591.9	1700	25	0.0	1.0	11.0	88.0	Y	Y	Y	-	-	Y	
895	07-11-91	5594.3	1850	20	0.0	2.0	13.0	85.0	Y	Y	Y	-	-	Y	
911	07-15-91	5592.5	1575	-15	0.0	0.0	6.4	93.6	Y	Y	Y	-	-	Y	
918	07-16-91	5594.6	1400	0	0.0	2.0	11.8	86.2	Y	Y	Y	-	-	Y	
927	07-17-91	5597.9	1950	-25	0.0	1.0	7.9	91.1	Y	N	Y	-	-	N	OLM
928	07-17-91	5598.5	1675	0	0.0	1.0	11.8	87.2	Y	Y	Y	-	-	Y	
932	07-18-91	5606.8	2000	40	0.0	2.0	13.0	85.0	Y	N	Y	-	-	N	OLM
937	07-19-91	5596.3	1380	-10	0.0	5.0	12.0	83.0	Y	Y	Y	-	-	Y	
945	07-22-91	5601.5	1600	0	0.0	0.0	16.0	84.0	Y	N	Y	-	-	N	OLM
948	07-23-91	5599.0	1375	35	0.0	1.0	21.0	78.0	Y	Y	Y	-	-	Y	
951	07-24-91	5606.1	1845	30	0.0	3.0	13.0	84.0	Y	N	Y	-	-	N	OLM
960	07-25-91	5606.7	1700	60	0.0	31.0	16.0	53.0	Y	N	Y	-	-	N	OLM
966	07-27-91	5602.1	1400	30	0.0	1.0	15.0	84.0	N	Y	Y	-	-	N	OLD
975	07-27-91	5610.9	1950	50	0.0	4.0	16.5	79.5	Y	Y	Y	-	-	Y	
976	07-27-91	5611.4	1725	0	0.0	15.0	15.0	70.0	N	Y	Y	-	-	N	OLD
984	07-30-91	5611.9	1590	24	0.0	7.0	15.0	78.0	Y	N	Y	-	-	N	OLM
986	07-30-91	5614.3	1775	45	0.0	21.0	15.0	64.0	Y	Y	Y	-	-	Y	
1005	08-02-91	5616.9	1750	7	1.0	12.0	16.0	71.0	Y	Y	Y	-	-	Y	
1012.	08-03-91	5613.6	1420	-10	0.0	8.0	18.0	74.0	Y	Y	Y	-	-	Y	

QUALITY ACCEPTANCE TESTING - SPECIFICATIONS COMPARISON REPORT REPORT NUMBER: IC.0

TEST NUMBER	DATE	ELEV	LOCATION STATION	LOCATION OFFSET	% COBBL	% GRAV	% SAND	% FINES	% COMPACTION DESIGN >= 95%	MOISTURE IN SPEC -3 %- 1 %	GRADATION IN SPEC	GRAVELS IN SPEC > %	FINES IN SPEC < %	TEST IN SPEC	STATUS FAILED TESTS
1027	08-06-91	5614.4	1350	12	0.0	3.0	17.0	80.0	Y	Y	Y	-	-	Y	
1036	08-07-91	5623.0	1830	30	0.0	3.0	19.0	78.0	Y	Y	Y	-	-	Y	
1043	08-08-91	5622.4	1565	30	0.0	2.0	17.0	81.0	Y	Y	Y	-	-	Y	
1052	08-08-91	5620.7	1450	30	0.0	4.0	24.0	72.0	Y	Y	Y	-	-	Y	
1061	08-10-91	5624.9	1560	10	0.0	2.0	21.0	77.0	Y	Y	Y	-	-	Y	
1064	08-10-91	5617.6	1350	-3	0.0	9.0	17.0	74.0	Y	N	Y	-	-	N	OLM
1071	08-12-91	5626.6	1550	15	2.0	15.0	23.0	60.0	Y	Y	Y	-	-	Y	
1074	08-12-91	5626.0	1350	-12	0.0	12.0	18.0	70.0	Y	Y	Y	-	-	Y	
1078	08-12-91	5629.7	1800	90	0.0	2.0	18.5	79.5	Y	Y	Y	-	-	Y	
1083	08-13-91	5629.2	1580	12	0.0	4.0	13.0	83.0	Y	Y	Y	-	-	Y	
1085	08-14-91	5627.0	1505	6	0.0	12.0	16.0	72.0	Y	Y	Y	-	-	Y	
1096	08-14-91	5613.8	2025	-6	0.0	4.0	12.0	84.0	Y	Y	Y	-	-	Y	
1098	08-17-91	5632.2	1610	25	0.0	3.0	10.0	87.0	Y	Y	Y	-	-	Y	
1112	08-19-91	5634.3	1615	45	0.0	3.0	14.0	83.0	Y	Y	Y	-	-	Y	
1122	08-20-91	5635.7	1675	20	0.0	3.0	24.0	73.0	Y	N	Y	-	-	N	OLM
1130	08-21-91	5635.8	1750	25	0.0	1.0	15.0	84.0	Y	Y	Y	-	-	Y	
1144	08-22-91	5634.2	1415	0	0.0	18.0	17.0	65.0	Y	N	Y	-	-	N	OLM
1153	08-23-91	5639.0	1625	-10	0.0	8.0	16.8	75.2	Y	Y	Y	-	-	Y	
1193	08-24-91	5629.9	1925	25	0.0	18.0	18.0	64.0	Y	Y	Y	-	-	Y	
1237	08-30-91	5634.0	1875	-25	0.0	26.0	23.0	51.0	Y	N	Y	-	-	N	OLM
1242	08-31-91	5622.6	2050	-20	10.0	19.0	14.0	57.0	Y	Y	Y	-	-	Y	
1253	08-31-91	5641.7	1725	-10	0.0	5.0	18.0	77.0	N	Y	Y	-	-	N	RW,RT
1258	09-04-91	5634.5	1900	-20	0.0	17.0	14.0	69.0	Y	Y	Y	-	-	Y	
1271	09-05-91	5639.3	1850	0	0.0	6.0	14.0	80.0	Y	N	Y	-	-	N	OLM
1253A	09-05-91	5641.7	1725	-10	0.0	5.0	18.0	77.0	Y	N	Y	-	-	N	OLM
1300	09-15-91	5643.7	1500	-17	0.0	2.0	31.0	67.0	Y	Y	Y	-	-	Y	
1301	09-15-91	5633.5	2000	0	0.0	4.0	14.0	82.0	Y	Y	Y	-	-	Y	
1304	09-17-91	5644.2	1850	-6	0.0	3.0	27.0	70.0	Y	Y	Y	-	-	Y	
1312	09-18-91	5643.3	1968	52	0.0	11.0	24.0	65.0	Y	Y	Y	-	-	Y	
1319	09-20-91	5643.4	2078	-2	0.0	11.0	15.0	74.0	Y	Y	Y	-	-	Y	
1327	09-21-91	5649.2	1473	24	0.0	5.0	20.0	75.0	Y	Y	Y	-	-	Y	
1329	09-22-91	5646.1	2140	-6	0.0	21.0	19.0	60.0	Y	Y	Y	-	-	Y	
1343	09-24-91	5653.5	1288	24	0.0	1.0	15.0	84.0	Y	Y	Y	-	-	Y	
1345	09-24-91	5652.5	1747	23	0.0	12.0	18.0	70.0	Y	N	Y	-	-	N	OLM
1353	09-26-91	5653.1	1494	24	0.0	1.0	12.0	87.0	Y	Y	Y	-	-	Y	
1359	09-27-91	5651.7	1607	-6	0.0	16.0	17.5	66.5	Y	N	Y	-	-	N	OLM
1365	09-29-91	5658.2	2260	6	0.0	16.0	16.0	68.0	Y	N	Y	-	-	N	OLM
1370	09-30-91	5657.7	1643	-17	0.0	6.0	17.0	77.0	Y	Y	Y	-	-	Y	
1373	10-01-91	5658.0	1864	-16	0.0	13.0	20.0	67.0	Y	Y	Y	-	-	Y	
1395	10-03-91	5658.1	1720	-12	0.0	4.0	14.0	82.0	Y	Y	Y	-	-	Y	
1420	10-08-91	5663.2	2250	-20	0.0	2.0	9.0	89.0	Y	Y	Y	-	-	Y	
1424	10-09-91	5663.1	1290	42	0.0	1.0	13.0	86.0	Y	Y	Y	-	-	Y	
1429	10-10-91	5661.9	1597	-7	0.0	1.0	8.0	91.0	Y	Y	Y	-	-	Y	
1457	10-11-91	5663.1	1397	24	0.0	3.0	18.0	79.0	Y	Y	Y	-	-	Y	
1463	10-12-91	5664.3	1724	10	0.0	4.0	22.5	73.5	Y	Y	Y	-	-	Y	
1478	10-16-91	5667.1	1657	18	0.0	4.0	10.0	86.0	Y	Y	Y	-	-	Y	
1507	10-22-91	5669.7	1725	10	0.0	1.0	12.0	87.0	Y	Y	Y	-	-	Y	
1613	04-15-92	5668.9	1850	24	0.0	7.0	14.0	79.0	Y	N	Y	-	-	N	RW,RT
1631	04-17-92	5670.7	2012	6	0.0	3.0	17.0	80.0	Y	Y	Y	-	-	Y	
1613A	04-17-92	5668.9	1850	24	0.0	7.0	14.0	79.0	Y	Y	Y	-	-	Y	
1632	04-20-92	5665.7	2321	0	0.0	1.0	19.0	80.0	Y	Y	Y	-	-	Y	
1636	04-21-92	5670.0	1623	-1	0.0	3.0	12.0	85.0	Y	Y	Y	-	-	Y	

TEST NUMBER	DATE	ELEV	LOCATION STATION	LOCATION OFFSET	% COBBL	% GRAV	% SAND	% FINES	% COMPACTION DESIGN >= 95%	MOISTURE IN SPEC -3 %- 1 %	GRADATION IN SPEC	GRAVELS IN SPEC > %	FINES IN SPEC < %	TEST IN SPEC	STATUS FAILED TESTS
1637	04-24-92	5672.9	2100	0	0.0	5.0	13.0	82.0	Y	Y	Y	-	-	Y	
1641	04-26-92	5671.7	2279	-30	0.0	5.0	14.0	81.0	Y	Y	Y	-	-	Y	
1649	04-27-92	5668.5	1261	23	0.0	7.0	15.0	78.0	Y	Y	Y	-	-	Y	
1655	04-27-92	5676.1	2375	-14	0.0	5.0	15.0	80.0	Y	Y	Y	-	-	Y	
1668	04-29-92	5676.5	1627	0	0.0	7.0	17.0	76.0	Y	N	Y	-	-	N	OLM
1669	04-29-92	5672.6	1254	31	0.0	1.0	9.0	90.0	Y	N	Y	-	-	N	OLM
1676	05-01-92	5673.8	1500	-15	0.0	6.0	15.0	79.0	Y	Y	Y	-	-	Y	
1686	05-03-92	5680.2	2085	-15	0.0	3.0	18.0	79.0	Y	N	Y	-	-	N	OLM
1699	05-06-92	5679.2	1488	1	0.0	5.0	16.0	79.0	Y	Y	Y	-	-	Y	
1720	05-14-92	5683.7	1990	0	0.0	8.0	15.0	77.0	Y	Y	Y	-	-	Y	
1724	05-15-92	5683.8	1240	4	0.0	6.0	14.0	80.0	Y	Y	Y	-	-	Y	
1727	05-16-92	5685.0	2290	25	0.0	10.0	16.0	74.0	Y	Y	Y	-	-	Y	
1731	05-17-92	5687.0	1849	2	0.0	2.0	11.0	87.0	Y	Y	Y	-	-	Y	
1741	05-19-92	5686.0	1425	0	0.0	1.0	12.0	87.0	Y	Y	Y	-	-	Y	
1751	05-27-92	5688.7	2425	-6	0.0	3.0	9.0	88.0	Y	Y	Y	-	-	Y	
1755	05-27-92	5687.7	1235	15	0.0	3.0	14.0	83.0	Y	Y	Y	-	-	Y	
1757	05-27-92	5688.6	2175	0	0.0	9.0	16.0	75.0	Y	Y	Y	-	-	Y	
1766	05-29-92	5690.2	2100	0	0.0	2.0	15.0	83.0	Y	Y	Y	-	-	Y	
1778	05-31-92	5689.5	2220	-11	0.0	3.0	11.0	86.0	Y	Y	Y	-	-	Y	
1797	06-04-92	5691.8	1603	0	0.0	4.0	15.0	81.0	Y	Y	Y	-	-	Y	
1799	06-04-92	5690.1	1228	25	0.0	7.0	17.0	76.0	Y	N	Y	-	-	N	OLM
1811	06-06-92	5691.6	1225	-8	0.0	2.0	16.0	82.0	Y	N	Y	-	-	N	OLM
1822	06-09-92	5694.7	1700	0	0.0	3.0	13.0	84.0	Y	Y	Y	-	-	Y	
1834	06-10-92	5697.5	1400	-12	3.0	17.0	16.0	64.0	Y	N	Y	-	-	N	OLM
1838	06-11-92	5696.7	2453	7	0.0	6.0	13.0	81.0	Y	N	Y	-	-	N	OLM
1864	06-20-92	5700.5	1900	23	3.0	7.0	15.0	75.0	Y	Y	Y	-	-	Y	
1876	06-23-92	5701.0	2196	-11	3.0	3.0	16.0	78.0	Y	Y	Y	-	-	Y	
1889	06-25-92	5702.8	1724	0	0.0	4.0	14.0	82.0	Y	N	Y	-	-	N	RW,RT
1891	06-25-92	5702.7	1639	-6	0.0	3.0	15.0	82.0	Y	Y	Y	-	-	Y	
1894	06-25-92	5702.6	1215	-14	2.0	9.0	21.0	68.0	Y	Y	Y	-	-	Y	
1907	06-27-92	5704.4	1202	19	0.0	2.0	20.0	78.0	Y	Y	Y	-	-	Y	RW
1913	06-28-92	5706.8	2099	-10	0.0	5.0	22.0	73.0	Y	Y	Y	-	-	Y	
1927	07-01-92	5710.3	1900	0	0.0	4.0	22.0	74.0	Y	N	Y	-	-	N	OLM
1931	07-02-92	5706.3	1201	25	0.0	6.0	20.0	74.0	Y	N	Y	-	-	N	OLM
1939	07-03-92	5704.8	2300	0	0.0	7.0	21.0	72.0	Y	Y	Y	-	-	Y	
1958	07-08-92	5711.1	2254	14	0.0	1.0	13.0	86.0	Y	Y	Y	-	-	Y	
1963	07-09-92	5711.8	1400	0	0.0	5.0	11.0	84.0	Y	Y	Y	-	-	Y	
1970	07-10-92	5710.4	1195	12	0.0	1.0	13.0	86.0	Y	Y	Y	-	-	Y	
1987	07-16-92	5711.2	1694	9	0.0	4.0	14.0	82.0	Y	Y	Y	-	-	Y	
1995	07-18-92	5714.7	2519	27	0.0	2.0	13.0	85.0	Y	N	Y	-	-	N	OLM
2020	07-21-92	5721.3	2085	1	0.0	9.0	15.0	76.0	Y	Y	Y	-	-	Y	
2033	07-23-92	5722.4	2086	-2	0.0	6.0	17.0	77.0	Y	Y	Y	-	-	Y	
2043	07-27-92	5722.2	2458	10	0.0	2.0	12.0	86.0	Y	Y	Y	-	-	Y	
2055	07-28-92	5725.8	2552	-13	0.0	1.0	11.0	88.0	N	N	Y	-	-	N	OLD,M
2057	07-28-92	5730.0	1630	-3	0.0	0.0	10.0	90.0	Y	Y	Y	-	-	Y	
2063	07-29-92	5728.7	1998	-12	2.0	5.0	15.0	78.0	Y	Y	Y	-	-	Y	
2086	08-01-92	5729.0	1250	21	0.0	3.0	12.0	85.0	N	N	Y	-	-	N	OLD,M
2093	08-03-92	5732.0	1430	-10	0.0	7.0	15.0	78.0	Y	Y	Y	-	-	Y	
2112	08-04-92	5734.6	1847	14	3.0	18.0	16.0	63.0	N	N	Y	-	-	N	OLD,M
2118	08-05-92	5735.6	1927	7	0.0	8.0	19.0	73.0	Y	Y	Y	-	-	Y	
2120	08-06-92	5734.6	1859	-9	0.0	3.0	12.0	85.0	Y	N	Y	-	-	N	OLM
2127	08-07-92	5736.5	1149	-2	0.0	3.0	15.0	82.0	N	N	Y	-	-	N	OLD,M

QUALITY ACCEPTANCE TESTING - SPECIFICATIONS COMPARISON REPORT REPORT NUMBER: IC.0

TEST NUMBER	DATE	ELEV	LOCATION STATION	LOCATION OFFSET	% COBBL	% GRAV	% SAND	% FINES	% COMPACTION DESIGN >= 95%	MOISTURE IN SPEC -3 %- 1 %	GRADATION IN SPEC	GRAVELS IN SPEC > %	FINES IN SPEC < %	TEST IN SPEC	STATUS FAILED TESTS
2130	08-10-92	5734.7	2399	1	1.0	10.0	17.0	72.0	Y	Y	Y	-	-	Y	
2134	08-11-92	5739.8	2111	-8	0.0	1.0	16.0	83.0	Y	Y	Y	-	-	Y	
2137	08-11-92	5738.2	1389	-3	0.0	7.0	20.0	73.0	Y	Y	Y	-	-	Y	
2146	08-12-92	5743.2	1850	1	0.0	3.0	13.0	84.0	Y	Y	Y	-	-	Y	
2175	08-14-92	5744.2	1646	0	0.0	5.0	15.0	80.0	Y	N	Y	-	-	N	OLM
2178	08-15-92	5740.4	2589	19	0.0	4.0	17.0	79.0	Y	N	Y	-	-	N	OLM
2183	08-15-92	5744.4	1139	9	0.0	2.0	31.0	67.0	Y	N	Y	-	-	N	OLM
2188	08-17-92	5747.0	1665	-9	0.0	4.0	30.0	66.0	Y	Y	Y	-	-	Y	
2196	08-18-92	5744.9	2399	16	0.0	3.0	19.0	78.0	Y	Y	Y	-	-	Y	
2204	08-20-92	5744.0	2516	-2	0.0	5.0	21.2	73.8	Y	Y	Y	-	-	Y	
2215	08-22-92	5749.8	2622	-4	0.0	1.1	16.7	82.2	Y	Y	Y	-	-	Y	
2219	08-24-92	5752.1	1922	3	0.0	1.5	21.4	77.1	Y	Y	Y	-	-	Y	
2227	08-25-92	5752.5	1246	2	0.0	1.0	25.0	74.0	Y	Y	Y	-	-	Y	
2231	08-26-92	5755.8	1841	-5	1.0	6.0	35.0	58.0	Y	N	Y	-	-	N	OLM
2240	08-28-92	5757.2	1123	18	0.0	4.0	18.0	78.0	Y	Y	Y	-	-	Y	
2247	08-28-92	5756.9	2414	2	0.0	3.0	40.0	57.0	Y	N	Y	-	-	N	OLM
2256	08-30-92	5760.0	1426	-2	0.0	2.0	30.0	68.0	Y	Y	Y	-	-	Y	
2266	09-02-92	5761.7	2159	-6	0.0	5.0	24.0	71.0	Y	Y	Y	-	-	Y	
2269	09-02-92	5764.7	1110	-11	0.0	1.0	18.0	81.0	Y	Y	Y	-	-	Y	
2272	09-03-92	5765.5	1698	10	0.0	3.0	17.0	80.0	Y	Y	Y	-	-	Y	
2273	09-03-92	5763.2	1297	-13	0.0	3.0	22.0	75.0	Y	N	Y	-	-	N	OLM
2276	09-08-92	5766.3	1995	10	0.0	1.0	23.0	76.0	Y	Y	Y	-	-	Y	
2281	09-09-92	5768.5	1930	13	0.0	2.0	23.0	75.0	Y	Y	Y	-	-	Y	
2286	09-09-92	5769.2	2679	-3	0.0	2.0	30.0	68.0	Y	Y	Y	-	-	Y	
2291	09-10-92	5769.4	1954	-5	0.0	3.0	25.0	72.0	Y	Y	Y	-	-	Y	
2303	09-12-92	5772.7	1725	-6	4.0	12.0	21.0	63.0	Y	Y	Y	-	-	Y	
2304	09-12-92	5768.9	1090	2	0.0	4.0	13.0	83.0	Y	Y	Y	-	-	Y	
2311	09-14-92	5771.6	2617	-4	1.0	3.0	13.0	83.0	Y	Y	Y	-	-	Y	
2319	09-15-92	5777.1	1139	3	0.0	1.0	19.0	80.0	Y	Y	Y	-	-	Y	
2329	09-17-92	5781.9	1500	-7	0.0	0.0	15.0	85.0	Y	Y	Y	-	-	Y	
2331	09-17-92	5781.4	1082	13	0.0	6.0	18.0	76.0	Y	Y	Y	-	-	Y	
2335	09-18-92	5782.7	2289	-2	0.0	5.0	19.0	76.0	Y	Y	Y	-	-	Y	
2340	09-19-92	5779.4	2658	-3	0.0	25.0	18.0	57.0	N	N	Y	-	-	N	RM
2341	09-19-92	5783.3	1076	4	0.0	1.0	20.0	79.0	Y	N	Y	-	-	N	OLM
2342	09-20-92	5785.8	1252	-1	0.0	13.0	19.0	68.0	Y	Y	Y	-	-	Y	
2347	09-21-92	5789.1	1575	1	0.0	8.0	14.0	78.0	Y	Y	Y	-	-	Y	
2354	09-22-92	5788.4	2409	0	0.0	5.0	21.0	74.0	Y	Y	Y	-	-	Y	
2357	09-23-92	5782.3	2680	-7	0.0	3.0	24.0	73.0	Y	Y	Y	-	-	Y	
2361	09-24-92	5796.2	1984	5	0.0	3.0	20.0	77.0	Y	N	Y	-	-	N	OLM
2366	09-25-92	5792.6	1060	12	0.0	9.0	20.0	71.0	Y	Y	Y	-	-	Y	
2371	09-26-92	5790.9	2587	3	0.0	6.0	14.0	80.0	Y	Y	Y	-	-	Y	
2373	09-26-92	5791.0	2751	13	0.0	6.0	19.0	75.0	Y	N	Y	-	-	N	OLM
2375	09-28-92	5796.6	2628	-5	0.0	13.0	17.0	70.0	Y	Y	Y	-	-	Y	
2378	09-29-92	5804.2	1897	-1	0.0	8.0	19.0	73.0	Y	Y	Y	-	-	Y	
2380	09-30-92	5803.7	1250	0	2.0	17.0	37.0	44.0	Y	Y	N	-	-	N	
2382	09-30-92	5802.0	1047	0	0.0	5.0	33.0	62.0	-	-	Y	-	-	Y	
2385	10-02-92	5806.5	1405	2	0.0	9.0	15.0	76.0	Y	N	Y	-	-	N	OLM
2388	10-05-92	5810.0	1613	0	0.0	0.0	16.0	84.0	Y	N	Y	-	-	N	RW
2391	10-06-92	5809.5	1045	-5	0.0	1.0	20.0	79.0	Y	N	Y	-	-	N	OLM
2394	10-07-92	5807.9	2775	-5	0.0	2.0	22.0	76.0	Y	Y	Y	-	-	Y	
2395	10-08-92	5808.3	2442	0	0.0	4.0	20.0	76.0	Y	Y	Y	-	-	Y	

QUALITY ACCEPTANCE TESTING - SPECIFICATIONS COMPARISON REPORT   REPORT NUMBER: IC.0

TEST NUMBER	DATE	ELEV	LOCATION STATION	LOCATION OFFSET	% COBBL	% GRAV	% SAND	% FINES	% COMPACTION DESIGN >= 95%	MOISTURE IN SPEC -3 %- 1 %	GRADATION IN SPEC	GRAVELS IN SPEC > %	FINES IN SPEC < %	TEST IN SPEC	STATUS FAILED TESTS
NOTE: These statistics include only results of tests that are NOT designated as RM, RW, or RW,RT.					FAILING TEST LOCATIONS				6	46	1	0	0	49	
					PASSING TEST LOCATIONS				184	144	190	0	0	142	
					TOTAL TEST LOCATIONS				190	190	191	0	0	191	
					% FAILING TEST LOCATIONS				3.2	24.2	0.5	0.0	0.0	25.7	

REMARKS LEGEND

RM - Test Location Removed
RW - Test Loc. Reworked and NOT Retested
RW,RT - Test Loc. Reworked and Retested
AR - Additional Rolling at Test Location
A - Abutment Test

TEST LOCATIONS REWORKED - UNTESTED..	3
TEST LOCATIONS REWORKED - RETESTED..	3
TEST LOCATIONS REMOVED.............	1
FAILED TEST LOCATIONS NOT REWORKED OR RETESTED..	49
PERCENT OF FAILED TEST LOCATIONS NOT REWORKED OR RETESTED IN PERMANENT FILL..	25.7

COMMENT: THIS REPORT COVERS THE ENTIRE CONSTRUCTION OF THE DAM.

LAB CHIEF: ______________________

SUBMITTED BY: ______________________
PROJECT ENGINEER

QUALITY ACCEPTANCE TESTING - GRADATIONS REPORT	REPORT NUMBER: IC.1	

PROJECT: LITTLE DELL LAKE, DAM AND APPURTENANCES RIVER: SALT LAKE CITY STREAMS STATE: UTAH TOWN: SALT LAKE CITY	CONTRACT NO. DACW05-89-C-0045 CONTRACTOR: CLEMENT BROTHERS AND J.E. STARNES CO.	DATE OF REPORT: 12-08-92 01-01-90 THRU 12-31-92

EMBANKMENT ZONE	MIN. DESIGNED % COMP	SPEC. W.C. % RANGE	LOOSE LIFT THICK. (IN)	NUMBER OF PASSES	COMPACTION EQUIPMENT
IMPERVIOUS	95	-3 TO 1	8	6	CAT 825C, 980, 950

TEST NUMBER	DATE	ELEV	LOCATION		GRADATION - PERCENT PASSING										LL	PI	CLASSIFICATION
			STATION	OFFSET	6 IN	3 IN	1 IN	3/4IN	3/8IN	# 4	# 10	# 40	#100	#200			
478	09-22-90	5576.5	1503	-1	100.0	100.0	100.0	99.0	99.0	98.0	97.0	96.0	94.0	85.0	40.0	23.0	CL WITH SA
481	09-24-90	5576.8	1587	-9	100.0	100.0	100.0	100.0	99.0	99.0	98.0	97.0	94.0	83.0	38.0	22.0	CL WITH SA
485	09-25-90	5579.3	1570	27	100.0	100.0	100.0	100.0	99.6	99.0	98.0	97.0	94.0	85.0	40.0	24.0	CL WITH SA
488	09-26-90	5579.0	1420	41	100.0	100.0	100.0	100.0	100.0	99.0	99.0	98.0	95.0	86.0	41.0	23.0	CL
492	09-27-90	5579.5	1600	5	100.0	100.0	100.0	100.0	100.0	98.0	97.0	96.0	94.0	85.0	39.0	22.0	CL WITH SA
495	09-29-90	5580.0	1478	29	100.0	100.0	96.0	95.0	94.0	92.0	91.0	89.0	86.0	77.0	40.0	24.0	CL WITH SA
502	10-02-90	5581.8	1550	40	100.0	100.0	100.0	98.0	96.0	95.0	94.0	93.0	90.0	81.0	39.0	22.0	CL WITH SA
505	10-03-90	5579.3	1620	-15	100.0	100.0	100.0	100.0	98.0	97.0	96.0	94.0	92.0	83.0	40.0	22.0	CL WITH SA
513	10-04-90	5582.0	1525	-10	100.0	100.0	100.0	98.0	97.0	96.0	95.0	94.0	92.0	84.0			CL WITH SA
514	10-05-90	5580.6	1580	-15	100.0	100.0	100.0	100.0	99.0	98.0	97.0	96.0	94.0	86.0	41.0	23.0	CL
518	10-09-90	5580.5	1500	-25	100.0	100.0	100.0	97.0	94.0	93.0	91.0	89.0	87.0	80.0	40.0	22.0	CL WITH SA
537	10-13-90	5582.5	1568	12	100.0	100.0	93.0	93.0	92.0	92.0	92.0	91.0	89.0	82.0	45.0	25.0	CL WITH SA & GR
540	10-15-90	5583.5	1586	2	100.0	100.0	100.0	99.0	96.0	95.0	94.0	93.0	90.0	82.0	40.0	25.0	CL WITH SA
547	10-17-90	5586.0	1672	35	100.0	100.0	100.0	100.0	99.0	98.0	98.0	96.0	93.0	82.0	35.0	18.0	CL WITH SA
549	10-18-90	5589.6	1380	14	100.0	100.0	100.0	100.0	100.0	99.0	99.0	98.0	96.0	88.0	41.0	24.0	CL WITH SA
566	10-25-90	5586.0	1750	25	100.0	100.0	100.0	100.0	100.0	99.0	99.0	98.0	96.0	88.0	44.0	27.0	CL
568	10-25-90	5587.0	1500	26	100.0	100.0	100.0	100.0	100.0	100.0	100.0	99.0	97.0	91.0	45.0	26.0	CL
570	10-26-90	5586.1	1525	-30	100.0	100.0	100.0	100.0	100.0	100.0	100.0	99.7	99.0	95.0	32.0	16.0	CL
587	10-29-90	5586.6	1475	10	100.0	100.0	98.0	97.0	96.0	95.0	95.0	93.0	88.0	78.0	38.0	22.0	CL WITH SA
867	07-04-91	5588.0	1600	0	100.0	100.0	100.0	100.0	99.0	99.0	98.0	96.0	94.0	86.0			CL
869	07-04-91	5589.0	1650	0	100.0	100.0	99.0	98.0	96.0	94.0	93.0	90.0	81.0	72.0	39.0	23.0	CL WITH SA
874	07-08-91	5589.9	1400	0	100.0	100.0	92.0	91.0	89.0	88.0	87.0	85.0	80.0	68.0			SA CL
880	07-09-91	5591.2	1500	0	100.0	100.0	100.0	99.0	99.0	98.0	97.0	92.0	84.0	72.0	44.0	28.0	CL WITH SA
881	07-09-91	5593.8	1875	0	100.0	100.0	100.0	100.0	99.0	99.0	99.0	98.0	95.0	89.0	43.0	27.0	CL
889	07-10-91	5591.9	1700	25	100.0	100.0	100.0	100.0	99.0	99.0	99.0	98.0	95.0	88.0	42.0	25.0	CL
895	07-11-91	5594.3	1850	20	100.0	100.0	100.0	100.0	99.0	98.0	97.0	96.0	92.0	85.0	41.0	26.0	CL WITH SA
911	07-15-91	5592.5	1575	-15	100.0	100.0	100.0	100.0	100.0	100.0	100.0	99.0	97.0	93.6	43.0	29.0	CL
918	07-16-91	5594.6	1400	0	100.0	100.0	99.0	99.0	99.0	98.0	97.0	95.0	91.0	86.2	43.0	28.0	CL
927	07-17-91	5597.9	1950	-25	100.0	100.0	100.0	100.0	99.5	99.0	98.5	97.5	95.0	91.1	43.0	26.5	CL
928	07-17-91	5598.5	1675	0	100.0	100.0	100.0	99.9	99.5	99.0	98.5	97.0	93.0	87.2	44.0	30.0	CL
932	07-18-91	5606.8	2000	40	100.0	100.0	99.0	99.0	99.0	98.0	98.0	95.0	90.0	85.0	43.0	28.0	CL WITH SA
937	07-19-91	5596.3	1380	-10	100.0	100.0	98.0	97.0	96.0	95.0	94.0	92.0	90.0	83.0	42.0	27.0	CL WITH SA
945	07-22-91	5601.5	1600	0	100.0	100.0	100.0	100.0	100.0	100.0	99.0	96.0	92.0	84.0	43.0	30.0	CL WITH SA
948	07-23-91	5599.0	1375	35	100.0	100.0	100.0	100.0	99.0	99.0	98.0	94.0	88.0	78.0			CL WITH SA
951	07-24-91	5606.1	1845	30	100.0	100.0	98.0	98.0	97.0	97.0	96.0	94.0	91.0	84.0	38.0	25.0	CL WITH SA
960	07-25-91	5606.7	1700	60	100.0	100.0	81.0	80.0	72.0	69.0	66.0	63.0	59.0	53.0			GR CL WITH SA
966	07-27-91	5602.1	1400	30	100.0	100.0	100.0	100.0	100.0	99.0	98.0	95.0	93.0	84.0			CL WITH SA
975	07-27-91	5610.9	1950	50	100.0	100.0	99.0	98.0	97.0	96.0	94.0	92.0	89.0	79.5	36.0	24.0	CL WITH SA
976	07-27-91	5611.4	1725	0	100.0	100.0	92.0	90.0	87.0	85.0	83.0	80.0	78.0	70.0			GR CL WITH SA
984	07-30-91	5611.9	1590	24	100.0	100.0	99.0	98.0	95.0	93.0	92.0	89.0	86.0	78.0	32.0	23.0	CL WITH SA
986	07-30-91	5614.3	1775	45	100.0	100.0	88.0	87.0	82.0	79.0	77.0	74.0	71.0	64.0			GR CL WITH SA
1005	08-02-91	5616.9	1750	7	100.0	99.0	94.0	93.0	89.0	87.0	84.0	81.0	77.0	71.0	36.0	19.0	CL WITH SA
1012	08-03-91	5613.6	1420	-10	100.0	100.0	98.0	97.0	94.0	92.0	89.0	86.0	82.0	74.0	46.0	29.0	CL WITH SA

TEST NUMBER	DATE	ELEV	LOCATION		GRADATION - PERCENT PASSING										LL	PI	CLASSIFICATION
			STATION	OFFSET	6 IN	3 IN	1 IN	3/4IN	3/8IN	# 4	# 10	# 40	#100	#200			
1027	08-06-91	5614.4	1350	12	100.0	100.0	99.0	99.0	97.0	97.0	95.0	93.0	89.0	80.0	35.0	21.0	CL WITH SA
1036	08-07-91	5623.0	1830	30	100.0	100.0	98.0	98.0	97.0	97.0	96.0	95.0	89.0	78.0			CL WITH SA
1043	08-08-91	5622.4	1565	30	100.0	100.0	100.0	99.0	98.0	98.0	97.0	95.0	91.0	81.0	34.0	19.0	CL WITH SA
1052	08-08-91	5620.7	1450	30	100.0	100.0	98.0	98.0	97.0	96.0	95.0	92.0	86.0	72.0			CL WITH SA
1061	08-10-91	5624.9	1560	10	100.0	100.0	99.0	99.0	99.0	98.0	98.0	95.0	89.0	77.0	35.0	19.0	CL WITH SA
1064	08-10-91	5617.6	1350	-3	100.0	100.0	98.0	97.0	94.0	91.0	89.0	86.0	82.0	74.0	37.0	23.0	CL WITH SA
1071	08-12-91	5626.6	1550	15	100.0	98.0	93.0	91.0	86.0	83.0	80.0	77.0	70.0	60.0			SA CL WITH GR
1074	08-12-91	5626.0	1350	-12	100.0	100.0	96.0	94.0	90.0	88.0	85.0	83.0	79.0	70.0	39.0	23.0	SA CL
1078	08-12-91	5629.7	1800	90	100.0	100.0	100.0	99.0	99.0	98.0	98.0	97.0	92.0	79.5			CL WITH SA
1083	08-13-91	5629.2	1580	12	100.0	100.0	98.0	98.0	97.0	96.0	95.0	93.0	90.0	83.0	29.0	13.0	CL WITH SA
1085	08-14-91	5627.0	1505	6	100.0	100.0	96.0	95.0	91.0	88.0	85.0	83.0	79.0	72.0			CL WITH SA
1096	08-14-91	5613.8	2025	-6	100.0	100.0	99.0	98.0	96.0	96.0	93.0	93.0	90.0	84.0	42.0	25.0	CL WITH SA
1098	08-17-91	5632.2	1610	25	100.0	100.0	100.0	99.0	98.0	97.0	96.0	95.0	92.0	87.0			CL
1112	08-19-91	5634.3	1615	45	100.0	100.0	100.0	99.0	98.0	97.0	97.0	95.0	92.0	83.0			CL WITH SA
1122	08-20-91	5635.7	1675	20	100.0	100.0	98.0	98.0	97.0	97.0	96.0	94.0	86.0	73.0			SA CL
1130	08-21-91	5635.8	1750	25	100.0	100.0	100.0	100.0	99.0	99.0	98.0	97.0	93.0	84.0	37.0	21.0	CL WITH SA
1144	08-22-91	5634.2	1415	0	100.0	100.0	93.0	91.0	86.0	82.0	79.0	75.0	71.0	65.0			GR CL WITH SA
1153	08-23-91	5639.0	1625	-10	100.0	100.0	95.0	93.0	92.0	92.0	91.0	90.0	86.0	75.2	33.0	17.0	CL WITH SA
1193	08-24-91	5629.9	1925	25	100.0	100.0	91.0	89.0	85.0	82.0	79.0	76.0	72.0	64.0			SA CL WITH GR
1237	08-30-91	5634.0	1875	-25	100.0	100.0	88.0	85.0	78.0	74.0	70.0	66.0	61.0	51.0	38.0	23.0	GR CL WITH SA
1242	08-31-91	5622.6	2050	-20	100.0	90.0	77.0	75.0	73.0	71.0	69.0	66.0	63.0	57.0			GR CL WITH SA
1253	08-31-91	5641.7	1725	-10	100.0	100.0	99.0	98.0	96.0	95.0	93.0	90.0	86.0	77.0			CL WITH SA
1258	09-04-91	5634.5	1900	-20	100.0	100.0	90.0	89.0	86.0	83.0	81.0	79.0	76.0	69.0	47.0	28.0	GR CL WITH SA
1271	09-05-91	5639.3	1850	0	100.0	100.0	99.0	98.0	96.0	94.0	93.0	91.0	88.0	80.0			SA CL
1253A	09-05-91	5641.7	1725	-10	100.0	100.0	99.0	98.0	96.0	95.0	93.0	90.0	86.0	77.0			CL WITH SA
1300	09-15-91	5643.7	1500	-17	100.0	100.0	100.0	99.0	99.0	98.0	97.0	95.0	85.0	67.0			SA CL
1301	09-15-91	5633.5	2000	0	100.0	100.0	97.0	97.0	97.0	96.0	95.0	93.0	89.0	82.0	38.0	20.0	CL WITH SA
1304	09-17-91	5644.2	1850	-6	100.0	100.0	99.0	99.0	99.0	97.0	96.0	91.0	82.0	70.0			SA CL
1312	09-18-91	5643.3	1968	52	100.0	100.0	96.0	93.0	91.0	89.0	87.0	83.0	76.0	65.0	42.0	22.0	SA CL
1319	09-20-91	5643.4	2078	-2	100.0	100.0	97.0	96.0	91.0	89.0	88.0	86.0	82.0	74.0	32.0	16.0	CL WITH SA
1327	09-21-91	5649.2	1473	24	100.0	100.0	99.0	98.0	97.0	95.0	94.0	91.0	86.0	75.0			CL WITH SA
1329	09-22-91	5646.1	2140	-6	100.0	100.0	93.0	90.0	82.0	79.0	76.0	73.0	68.0	60.0	36.0	21.0	GR CL WITH SA
1343	09-24-91	5653.5	1288	24	100.0	100.0	100.0	100.0	100.0	99.0	98.0	97.0	93.0	84.0	41.0	26.0	CL WITH SA
1345	09-24-91	5652.5	1747	23	100.0	100.0	97.0	95.0	90.0	88.0	85.0	83.0	78.0	70.0			SA CL
1353	09-26-91	5653.1	1494	24	100.0	100.0	100.0	100.0	99.0	99.0	98.0	97.0	94.0	87.0	27.0	13.0	CL
1359	09-27-91	5651.7	1607	-6	100.0	100.0	96.0	90.0	87.0	84.0	82.0	80.0	74.0	66.5			GR CL WITH SA
1365	09-29-91	5658.2	2260	6	100.0	100.0	93.0	89.0	87.0	84.0	83.0	80.0	76.0	68.0			SA CL WITH GR
1370	09-30-91	5657.7	1643	-17	100.0	100.0	98.0	97.0	96.0	94.0	92.0	89.0	85.0	77.0			CL WITH SA
1373	10-01-91	5658.0	1864	-16	100.0	100.0	97.0	94.0	89.0	87.0	85.0	82.0	77.0	67.0	41.0	25.0	SA CL
1395	10-03-91	5658.1	1720	-12	100.0	100.0	99.0	99.0	98.0	96.0	95.0	93.0	89.0	82.0			CL WITH SA
1420	10-08-91	5663.2	2250	-20	100.0	100.0	100.0	99.0	99.0	98.0	98.0	97.0	94.0	89.0			CL
1424	10-09-91	5663.1	1290	42	100.0	100.0	100.0	100.0	100.0	99.0	98.0	96.0	92.0	86.0			CL
1429	10-10-91	5661.9	1597	-7	100.0	100.0	100.0	99.0	99.0	99.0	99.0	98.0	96.0	91.0			CL
1457	10-11-91	5663.1	1397	24	100.0	100.0	100.0	99.0	98.0	97.0	96.0	92.0	86.0	79.0			CL WITH SA
1463	10-12-91	5664.3	1724	10	100.0	100.0	99.0	99.0	97.0	96.0	95.0	93.0	86.0	73.5	37.0	21.0	CL WITH SA
1478	10-16-91	5667.1	1657	18	100.0	100.0	99.0	98.0	97.0	96.0	95.0	94.0	91.0	86.0			CL
1507	10-22-91	5669.7	1725	10	100.0	100.0	100.0	100.0	99.0	99.0	98.0	96.0	93.0	87.0	42.0	26.0	CL
1613	04-15-92	5668.9	1850	24	100.0	100.0	99.0	98.0	97.0	93.0	91.0	89.0	86.0	79.0	39.0	21.0	CL WITH SA
1631	04-17-92	5670.7	2012	6	100.0	100.0	100.0	100.0	98.0	97.0	96.0	94.0	90.0	80.0			CL WITH SA
1613A	04-17-92	5668.9	1850	24	100.0	100.0	99.0	98.0	97.0	93.0	91.0	89.0	86.0	79.0			CL WITH SA
1632	04-20-92	5665.7	2321	0	100.0	100.0	100.0	100.0	100.0	99.0	98.0	92.0	87.0	80.0			CL WITH SA
1636	04-21-92	5670.0	1623	-1	100.0	100.0	100.0	100.0	98.0	97.0	96.0	94.0	91.0	85.0			CL WITH SA

QUALITY ACCEPTANCE TESTING - GRADATIONS REPORT REPORT NUMBER: IC.1

TEST NUMBER	DATE	ELEV	LOCATION		GRADATION - PERCENT PASSING										LL	PI	CLASSIFICATION
			STATION	OFFSET	6 IN	3 IN	1 IN	3/4IN	3/8IN	# 4	# 10	# 40	#100	#200			
1637	04-24-92	5672.9	2100	0	100.0	100.0	100.0	100.0	96.0	95.0	94.0	92.0	89.0	82.0	43.0	23.0	CL WITH SA
1641	04-26-92	5671.7	2279	-30	100.0	100.0	100.0	99.0	97.0	95.0	94.0	92.0	89.0	81.0			CL WITH SA
1649	04-27-92	5668.5	1261	23	100.0	100.0	99.0	98.0	95.0	93.0	92.0	90.0	86.0	78.0			CL WITH SA
1655	04-27-92	5676.1	2375	-14	100.0	100.0	99.0	99.0	97.0	95.0	93.0	91.0	88.0	80.0			CL WITH SA
1668	04-29-92	5676.5	1627	0	100.0	100.0	99.0	98.0	95.0	93.0	91.0	88.0	84.0	76.0	37.0	16.0	CL WITH SA
1669	04-29-92	5672.6	1254	31	100.0	100.0	100.0	100.0	99.0	99.0	98.0	97.0	95.0	90.0	45.0	27.0	CL
1676	05-01-92	5673.8	1500	-15	100.0	100.0	99.0	98.0	95.0	94.0	93.0	91.0	88.0	79.0	42.0	27.0	CL WITH SA
1686	05-03-92	5680.2	2085	-15	100.0	100.0	100.0	99.0	98.0	97.0	96.0	93.0	89.0	79.0	39.0	23.0	CL WITH SA
1699	05-06-92	5679.2	1488	1	100.0	100.0	98.0	97.0	96.0	95.0	94.0	90.0	86.0	79.0	42.0	27.0	CL WITH SA
1720	05-14-92	5683.7	1990	0	100.0	100.0	97.0	96.0	94.0	92.0	91.0	89.0	85.0	77.0			CL WITH SA
1724	05-15-92	5683.8	1240	4	100.0	100.0	98.0	98.0	95.0	94.0	93.0	91.0	87.0	80.0			CL WITH SA
1727	05-16-92	5685.0	2290	25	100.0	100.0	96.0	94.0	93.0	90.0	88.0	86.0	82.0	74.0	40.0	24.0	CL WITH SA
1731	05-17-92	5687.0	1849	2	100.0	100.0	100.0	99.0	98.0	98.0	97.0	96.0	93.0	87.0	43.0	20.0	CL
1741	05-19-92	5686.0	1425	0	100.0	100.0	100.0	100.0	99.0	99.0	98.0	96.0	93.0	87.0	41.0	29.0	CL
1751	05-27-92	5688.7	2425	-6	100.0	100.0	100.0	100.0	98.0	97.0	95.0	94.0	90.0	88.0	42.0	23.0	CL WITH SA
1755	05-27-92	5687.7	1235	15	100.0	100.0	100.0	99.0	98.0	97.0	97.0	94.0	91.0	83.0			CL WITH SA
1757	05-27-92	5688.6	2175	0	100.0	100.0	98.0	96.0	94.0	91.0	89.0	86.0	81.0	75.0			CL WITH SA
1766	05-29-92	5690.2	2100	0	100.0	100.0	100.0	100.0	99.0	98.0	97.0	94.0	90.0	83.0			CL WITH SA
1778	05-31-92	5689.5	2220	-11	100.0	100.0	100.0	100.0	98.0	97.0	96.0	95.0	92.0	86.0			CL
1797	06-04-92	5691.8	1603	0	100.0	100.0	99.0	98.0	97.0	96.0	94.0	91.0	88.0	81.0			CL WITH SA
1799	06-04-92	5690.1	1228	25	100.0	100.0	98.0	97.0	95.0	93.0	92.0	88.0	83.0	76.0			CL WITH SA
1811	06-06-92	5691.6	1225	-8	100.0	100.0	99.0	99.0	99.0	98.0	97.0	96.0	91.0	82.0			CL WITH SA
1822	06-09-92	5694.7	1700	0	100.0	100.0	98.0	98.0	97.0	97.0	96.0	94.0	91.0	84.0			CL WITH SA
1834	06-10-92	5697.5	1400	-12	100.0	97.0	89.0	86.0	84.0	80.0	78.0	76.0	71.0	64.0			GR CL WITH SA
1838	06-11-92	5696.7	2453	7	100.0	100.0	98.0	98.0	96.0	94.0	93.0	90.0	87.0	81.0	50.0	36.0	CH WITH SA
1864	06-20-92	5700.5	1900	23	100.0	97.0	92.0	91.0	91.0	90.0	89.0	86.0	82.0	75.0			CL WITH SA
1876	06-23-92	5701.0	2196	-11	100.0	97.0	96.0	96.0	95.0	94.0	92.0	90.0	85.0	78.0			CL WITH SA
1889	06-25-92	5702.8	1724	0	100.0	100.0	100.0	99.0	97.0	96.0	95.0	93.0	89.0	82.0			CL WITH SA
1891	06-25-92	5702.7	1639	-6	100.0	100.0	100.0	99.0	98.0	97.0	96.0	95.0	90.0	82.0			CL WITH SA
1894	06-25-92	5702.6	1215	-14	100.0	98.0	94.0	93.0	91.0	89.0	87.0	84.0	78.0	68.0	36.0	23.0	SA CL
1907	06-27-92	5704.4	1202	19	100.0	100.0	99.0	99.0	99.0	98.0	97.0	94.0	87.0	78.0	37.0	23.0	CL WITH SA
1913	06-28-92	5706.8	2099	-10	100.0	100.0	98.0	98.0	96.0	95.0	94.0	90.0	84.0	73.0			CL WITH SA
1927	07-01-92	5710.3	1900	0	100.0	100.0	98.0	97.0	97.0	96.0	94.0	91.0	85.0	74.0			CL WITH SA
1931	07-02-92	5706.3	1201	25	100.0	100.0	98.0	97.0	96.0	94.0	92.0	89.0	84.0	74.0			CL WITH SA
1939	07-03-92	5704.8	2300	0	100.0	100.0	98.0	97.0	95.0	93.0	90.0	87.0	82.0	72.0			CL WITH SA
1958	07-08-92	5711.1	2254	14	100.0	100.0	100.0	100.0	99.0	99.0	98.0	96.0	93.0	86.0			CL
1963	07-09-92	5711.8	1400	0	100.0	100.0	99.0	99.0	96.0	95.0	94.0	92.0	90.0	84.0	43.0	27.0	CL WITH SA
1970	07-10-92	5710.4	1195	12	100.0	100.0	100.0	100.0	100.0	99.0	98.0	97.0	94.0	86.0			CL
1987	07-16-92	5711.2	1694	9	100.0	100.0	99.0	98.0	97.0	96.0	95.0	93.0	90.0	82.0			CL WITH SA
1995	07-18-92	5714.7	2519	27	100.0	100.0	99.0	99.0	99.0	98.0	98.0	96.0	93.0	85.0			CL WITH SA
2020	07-21-92	5721.3	2085	1	100.0	100.0	96.0	95.0	93.0	91.0	90.0	88.0	84.0	76.0			CL WITH SA
2033	07-23-92	5722.4	2086	-2	100.0	100.0	99.0	99.0	96.0	94.0	93.0	91.0	87.0	77.0			CL WITH SA
2043	07-27-92	5722.2	2458	10	100.0	100.0	100.0	100.0	99.0	98.0	97.0	96.0	93.0	86.0			CL
2055	07-28-92	5725.8	2552	-13	100.0	100.0	100.0	100.0	99.0	99.0	99.0	97.0	95.0	88.0	33.0	18.0	CL
2057	07-28-92	5730.0	1630	-3	100.0	100.0	100.0	100.0	100.0	100.0	99.0	98.0	97.0	90.0			CL
2063	07-29-92	5728.7	1998	-12	100.0	98.0	96.0	95.0	95.0	93.0	92.0	90.0	86.0	78.0			CL WITH SA
2086	08-01-92	5729.0	1250	21	100.0	100.0	98.0	98.0	98.0	97.0	97.0	95.0	92.0	85.0	40.0	25.0	CL WITH SA
2093	08-03-92	5732.0	1430	-10	100.0	100.0	97.0	96.0	95.0	93.0	92.0	90.0	87.0	78.0			CL WITH SA
2112	08-04-92	5734.6	1847	14	100.0	97.0	89.0	87.0	83.0	79.0	77.0	75.0	71.0	63.0			GR CL WITH SA
2118	08-05-92	5735.6	1927	7	100.0	100.0	96.0	96.0	93.0	92.0	90.0	88.0	83.0	73.0	41.0	27.0	CL WITH SA
2120	08-06-92	5734.6	1859	-9	100.0	100.0	99.0	99.0	98.0	97.0	97.0	95.0	92.0	85.0			CL WITH SA
2127	08-07-92	5736.5	1149	-2	100.0	100.0	100.0	100.0	97.0	97.0	97.0	95.0	92.0	82.0			CL WITH SA

TEST NUMBER	DATE	ELEV	LOCATION		GRADATION - PERCENT PASSING										LL	PI	CLASSIFICATION
			STATION	OFFSET	6 IN	3 IN	1 IN	3/4IN	3/8IN	# 4	# 10	# 40	#100	#200			
2130	08-10-92	5734.7	2399	1	100.0	99.0	95.0	94.0	90.0	89.0	88.0	86.0	82.0	72.0	44.0	28.0	CL WITH SA
2134	08-11-92	5739.8	2111	-8	100.0	100.0	100.0	100.0	100.0	99.0	98.0	96.0	92.0	83.0			CL WITH SA
2137	08-11-92	5738.2	1389	-3	100.0	100.0	98.0	97.0	95.0	93.0	92.0	89.0	84.0	73.0			CL WITH SA
2146	08-12-92	5743.2	1850	1	100.0	100.0	100.0	99.0	98.0	97.0	96.0	95.0	92.0	84.0	47.0	32.0	CL WITH SA
2175	08-14-92	5744.2	1646	0	100.0	100.0	98.0	98.0	96.0	95.0	94.0	92.0	88.0	80.0			CL WITH SA
2178	08-15-92	5740.4	2589	19	100.0	100.0	98.0	97.0	96.0	96.0	95.0	94.0	90.0	79.0			CL WITH SA
2183	08-15-92	5744.4	1139	9	100.0	100.0	99.0	99.0	99.0	98.0	97.0	95.0	83.0	67.0			SA CL
2188	08-17-92	5747.0	1665	-9	100.0	100.0	99.0	98.0	97.0	96.0	96.0	93.0	83.0	66.0			SA CL
2196	08-18-92	5744.9	2399	16	100.0	100.0	99.0	98.0	98.0	97.0	97.0	95.0	90.0	78.0			CL WITH SA
2204	08-20-92	5744.0	2516	-2	100.0	100.0	98.0	97.0	96.0	95.0	94.0	92.0	85.0	73.8	29.0	15.0	CL WITH SA
2215	08-22-92	5749.8	2622	-4	100.0	100.0	99.8	99.6	99.4	98.9	97.0	93.0	89.0	82.2			CL WITH SA
2219	08-24-92	5752.1	1922	3	100.0	100.0	99.7	99.5	98.9	98.5	98.0	97.0	91.0	77.1			CL WITH SA
2227	08-25-92	5752.5	1246	2	100.0	100.0	100.0	100.0	100.0	99.0	99.0	98.0	97.0	74.0			CL WITH SA
2231	08-26-92	5755.8	1841	-5	100.0	99.0	95.0	94.0	94.0	93.0	93.0	91.0	79.0	58.0			SA CL
2240	08-28-92	5757.2	1123	18	100.0	100.0	100.0	99.0	97.0	96.0	95.0	90.0	85.0	78.0	44.0	30.0	CL WITH SA
2247	08-28-92	5756.9	2414	2	100.0	100.0	99.0	98.0	98.0	97.0	95.0	90.0	74.0	57.0			SA CL
2256	08-30-92	5760.0	1426	-2	100.0	100.0	100.0	99.0	98.0	98.0	97.0	96.0	84.0	68.0			SA CL
2266	09-02-92	5761.7	2159	-6	100.0	100.0	99.0	99.0	96.0	95.0	94.0	91.0	84.0	71.0	37.0	22.0	CL WITH SA
2269	09-02-92	5764.7	1110	-11	100.0	100.0	100.0	100.0	100.0	99.0	99.0	98.0	92.0	81.0			CL WITH SA
2272	09-03-92	5765.5	1698	10	100.0	100.0	99.0	99.0	97.0	97.0	96.0	95.0	91.0	80.0			CL WITH SA
2273	09-03-92	5763.2	1297	-13	100.0	100.0	99.0	99.0	98.0	97.0	96.0	95.0	89.0	75.0	39.0	26.0	CL WITH SA
2276	09-08-92	5766.3	1995	10	100.0	100.0	100.0	99.0	99.0	99.0	99.0	97.0	91.0	76.0	36.0	25.0	CL WITH SA
2281	09-09-92	5768.5	1930	13	100.0	100.0	100.0	100.0	99.0	98.0	98.0	98.0	90.0	75.0			CL WITH SA
2286	09-09-92	5769.2	2679	-3	100.0	100.0	99.0	99.0	98.0	98.0	97.0	95.0	83.0	68.0			SA CL
2291	09-10-92	5769.4	1954	-5	100.0	100.0	99.0	99.0	98.0	97.0	97.0	96.0	89.0	72.0	38.0	24.0	CL WITH SA
2303	09-12-92	5772.7	1725	-6	100.0	96.0	92.0	90.0	86.0	84.0	81.0	77.0	71.0	63.0			SA CL WITH GR
2304	09-12-92	5768.9	1090	2	100.0	100.0	99.0	98.0	97.0	96.0	95.0	94.0	91.0	83.0			CL WITH SA
2311	09-14-92	5771.6	2617	-4	100.0	99.0	98.0	98.0	97.0	96.0	96.0	94.0	92.0	83.0	43.0	28.0	CL WITH SA
2319	09-15-92	5777.1	1139	3	100.0	100.0	100.0	100.0	100.0	99.0	99.0	98.0	91.0	80.0			CL WITH SA
2329	09-17-92	5781.9	1500	-7	100.0	100.0	100.0	100.0	100.0	100.0	100.0	99.0	95.0	85.0			CL WITH SA
2331	09-17-92	5781.4	1082	13	100.0	100.0	99.0	99.0	95.0	94.0	92.0	90.0	85.0	76.0	41.0	28.0	CL WITH SA
2335	09-18-92	5782.7	2289	-2	100.0	100.0	99.0	98.0	97.0	95.0	94.0	92.0	86.0	76.0			CL WITH SA
2340	09-19-92	5779.4	2658	-3	100.0	100.0	94.0	91.0	80.0	75.0	70.0	67.0	65.0	57.0			GR CL WITH SA
2341	09-19-92	5783.3	1076	4	100.0	100.0	100.0	100.0	99.0	99.0	99.0	97.0	92.0	79.0			CL WITH SA
2342	09-20-92	5785.8	1252	-1	100.0	100.0	96.0	94.0	91.0	87.0	84.0	80.0	76.0	68.0	49.0	34.0	SA CL
2347	09-21-92	5789.1	1575	1	100.0	100.0	97.0	95.0	94.0	92.0	90.0	88.0	85.0	78.0			CL WITH SA
2354	09-22-92	5788.4	2409	0	100.0	100.0	100.0	99.0	97.0	95.0	94.0	92.0	87.0	74.0	45.0	28.0	CL WITH SA
2357	09-23-92	5782.3	2680	-7	100.0	100.0	99.0	99.0	98.0	97.0	97.0	95.0	87.0	73.0			CL WITH SA
2361	09-24-92	5796.2	1984	5	100.0	100.0	98.0	98.0	98.0	97.0	96.0	95.0	89.0	77.0			CL WITH SA
2366	09-25-92	5792.6	1060	12	100.0	100.0	95.0	94.0	93.0	91.0	90.0	88.0	82.0	71.0	36.0	20.0	CL WITH SA
2371	09-26-92	5790.9	2587	3	100.0	100.0	98.0	97.0	96.0	94.0	93.0	91.0	88.0	80.0			CL WITH SA
2373	09-26-92	5791.0	2751	13	100.0	100.0	97.0	97.0	95.0	94.0	93.0	91.0	86.0	75.0			CL WITH SA
2375	09-28-92	5796.6	2628	-5	100.0	100.0	92.0	91.0	89.0	87.0	85.0	82.0	78.0	70.0	38.0	21.0	CL WITH SA
2378	09-29-92	5804.2	1897	-1	100.0	100.0	98.0	97.0	94.0	92.0	91.0	88.0	84.0	73.0			CL WITH SA
2380	09-30-92	5803.7	1250	0	100.0	98.0	90.0	88.0	85.0	81.0	78.0	72.0	61.0	***44.0***	25.0	10.0	SC WITH GR
2382	09-30-92	5802.0	1047	0	100.0	100.0	97.0	96.0	96.0	95.0	95.0	92.0	83.0	62.0			SA CL
2385	10-02-92	5806.5	1405	2	100.0	100.0	99.0	98.0	92.0	91.0	90.0	88.0	84.0	76.0			CL WITH SA
2388	10-05-92	5810.0	1613	0	100.0	100.0	100.0	100.0	100.0	100.0	99.0	98.0	94.0	84.0			CL WITH SA
2391	10-06-92	5809.5	1045	-5	100.0	100.0	100.0	100.0	100.0	99.0	99.0	98.0	92.0	79.0			CL WITH SA
2394	10-07-92	5807.9	2775	-5	100.0	100.0	100.0	99.0	99.0	98.0	97.0	95.0	89.0	76.0	45.0	31.0	CL WITH SA
2395	10-08-92	5808.3	2442	0	100.0	100.0	99.0	98.0	97.0	96.0	95.0	93.0	87.0	76.0			CL WITH SA

QUALITY ACCEPTANCE TESTING - GRADATIONS REPORT																REPORT NUMBER: IC.1		PAGE 5 OF 5
TEST NUMBER	DATE	ELEV	LOCATION		GRADATION - PERCENT PASSING										LL	PI	CLASSIFICATION
			STATION	OFFSET	6 IN	3 IN	1 IN	3/4IN	3/8IN	# 4	# 10	# 40	#100	#200			

NOTE - Emphasized Numbers indicate percent passing outside of gradation range specified.

COMMENT: THIS REPORT COVERS THE ENTIRE CONSTRUCTION OF THE DAM.

LAB CHIEF: ____________________ SUBMITTED BY: ____________________
PROJECT ENGINEER

Note: Minimum 70% Fines required at abutments

A = Abutment test

QUALITY ACCEPTANCE TESTING - COMPACTION REPORT	REPORT NUMBER: IC.2	PAGE 1 OF 5
PROJECT: LITTLE DELL LAKE, DAM AND APPURTENANCES RIVER: SALT LAKE CITY STREAMS STATE: UTAH TOWN: SALT LAKE CITY	CONTRACT NO. DACW05-89-C-0045 CONTRACTOR: CLEMENT BROTHERS AND J.E. STARNES CO.	DATE OF REPORT: 12-08-92 01-01 90 THRU 12-31-92

EMBANKMENT ZONE	MIN. DESIGNED % COMP	SPEC. W.C. % RANGE	LOOSE LIFT THICK. (IN)	NUMBER OF PASSES	COMPACTION EQUIPMENT
IMPERVIOUS	95	-3 TO 1	8	6	CAT 825C, 980, 950

TEST NUMBER	DATE	ELEV	LOCATION		FIELD		STANDARD LAB COMPACTION			PERCENT COMPACTION	(1) PERCENT +- OMC	CLASSIFICATION
			STATION	OFFSET	DRY DENS (PCF)	MC %	TEST METH	MX DRY DEN	OMC %			
478	09-22-90	5576.5	1503	-1	108.3	18.8	5/478 6	103.6	19.7	104.5	-0.9	CL WITH SA
481	09-24-90	5576.8	1587	-9	101.6	18.2	5/481 6	103.9	20.4	97.8	-2.2	CL WITH SA
485	09-25-90	5579.3	1570	27	103.1	19.9	5/485 6	103.8	19.6	99.3	0.3	CL WITH SA
488	09-26-90	5579.0	1420	41	104.9	20.7	5/488 6	99.2	19.7	105.7	1.0	CL
492	09-27-90	5579.5	1600	5	105.0	19.5	5/492 6	100.5	20.2	104.5	-0.7	CL WITH SA
495	09-29-90	5580.0	1478	29	107.7	18.3	5/495 6	102.4	18.1	105.2	0.2	CL WITH SA
502	10-02-90	5581.8	1550	40	97.9	19.9	5/502 6	100.9	20.9	97.0	-1.0	CL WITH SA
505	10-03-90	5579.3	1620	-15	105.4	19.7	5/505 6	99.5	22.6	105.9	-2.9	CL WITH SA
513	10-04-90	5582.0	1525	-10	107.5	19.8	5/513 6	99.0	21.5	108.6	-1.7	CL WITH SA
514	10-05-90	5580.6	1580	-15	99.3	18.6	5/514 6	99.9	22.1	99.4	***-3.5***	CL
518	10-09-90	5580.5	1500	-25	105.8	19.7	5/518 6	99.4	22.3	106.4	-2.6	CL WITH SA
537	10-13-90	5582.5	1568	12	102.4	20.1	5/537 6	103.9	20.6	98.6	-0.5	CL WITH SA & GR
540	10-15-90	5583.5	1586	2	104.4	19.6	5/540 6	109.8	17.2	95.1	***2.4***	CL WITH SA
547	10-17-90	5586.0	1672	35	102.0	21.2	5/547 6	109.8	17.3	***92.9***	***3.9***	CL WITH SA
549	10-18-90	5589.6	1380	14	102.0	20.7	5/549 6	107.1	18.6	95.2	***2.1***	CL WITH SA
566	10-25-90	5586.0	1750	25	104.5	20.0	5/566 6	107.3	18.4	97.4	***1.6***	CL
568	10-25-90	5587.0	1500	26	105.5	20.2	H/567 6	103.5	20.8	101.9	-0.6	CL
570	10-26-90	5586.1	1525	-30	97.7	20.1	5/570 6	100.1	21.8	97.6	-1.7	CL
587	10-29-90	5586.6	1475	10	109.2	16.6	H/495 6	102.4	18.1	106.6	-1.5	CL WITH SA
867	07-04-91	5588.0	1600	0	107.2	18.8	3/867 6	107.9	17.1	99.4	***1.7***	CL
869	07-04-91	5589.0	1650	0	108.0	16.5	H/804	110.5	16.4	97.7	0.1	CL WITH SA
874	07-08-91	5589.9	1400	0	109.0	16.4	5/874 6	108.6	17.8	100.4	-1.4	SA CL
880	07-09-91	5591.2	1500	0	108.6	18.1	5/880 6	105.7	18.4	102.7	-0.3	CL WITH SA
881	07-09-91	5593.8	1875	0	105.6	16.5	3/881 6	106.3	18.3	99.3	-1.8	CL
889	07-10-91	5591.9	1700	25	108.2	16.8	5/889 6	105.0	17.7	103.0	-0.9	CL
895	07-11-91	5594.3	1850	20	110.2	15.7	5/895 6	106.8	18.0	103.2	-2.3	CL WITH SA
911	07-15-91	5592.5	1575	-15	99.8	17.7	H/481	103.9	20.4	96.1	-2.7	CL
918	07-16-91	5594.6	1400	0	112.8	16.4	5/918 6	106.9	17.4	105.5	-1.0	CL
927	07-17-91	5597.9	1950	-25	108.8	18.8	5/927 6	106.2	17.7	102.4	***1.1***	CL
928	07-17-91	5598.5	1675	0	109.9	17.6	4/928 6	105.8	19.3	103.9	-1.7	CL
932	07-18-91	5606.8	2000	40	111.0	13.3	5/932 6	104.5	19.9	106.2	***-6.6***	CL WITH SA
937	07-19-91	5596.3	1380	-10	106.4	18.6	H/910	107.7	18.1	98.8	0.5	CL WITH SA
945	07-22-91	5601.5	1600	0	108.8	15.4	H/901	106.2	18.7	102.4	***-3.3***	CL WITH SA
948	07-23-91	5599.0	1375	35	113.8	17.6	3/948 6	108.4	17.0	105.0	0.6	CL WITH SA
951	07-24-91	5606.1	1845	30	112.7	13.5	4/951 6	109.2	16.9	103.2	***-3.4***	CL WITH SA
960	07-25-91	5606.7	1700	60	109.4	18.7	5/960 6	107.8	17.1	101.5	***1.6***	GR CL WITH SA
966	07-27-91	5602.1	1400	30	97.3	17.4	4/966 6	109.0	17.0	***89.3***	0.4	CL WITH SA
975	07-27-91	5610.9	1950	50	110.5	17.8	4/975 6	108.6	17.5	101.7	0.3	CL WITH SA
976	07-27-91	5611.4	1725	0	103.2	14.8	4/976 6	110.8	16.0	***93.1***	-1.2	GR CL WITH SA
984	07-30-91	5611.9	1590	24	112.1	17.6	5/984 6	112.2	16.0	99.9	***1.6***	CL WITH SA
986	07-30-91	5614.3	1775	45	111.6	16.2	5/986 6	107.5	17.0	103.8	-0.8	GR CL WITH SA
1005	08-02-91	5616.9	1750	7	111.7	15.7	5/1005 6	111.7	16.1	100.0	-0.4	CL WITH SA
1012	08-03-91	5613.6	1420	-10	110.4	17.3	4/1012 6	104.8	18.6	105.3	-1.3	CL WITH SA

QUALITY ACCEPTANCE TESTING - COMPACTION REPORT — REPORT NUMBER: IC.2 —

TEST NUMBER	DATE	ELEV	LOCATION STATION	LOCATION OFFSET	FIELD DRY DENS (PCF)	FIELD MC %	STANDARD LAB COMPACTION TEST METH	STANDARD LAB COMPACTION MX DRY DEN	STANDARD LAB COMPACTION OMC %	PERCENT COMPACTION	PERCENT +- OMC	CLASSIFICATION
1027	08-06-91	5614.4	1350	12	114.1	16.4	5/1027 6	110.1	16.6	103.6	-0.2	CL WITH SA
1036	08-07-91	5623.0	1830	30	110.9	16.5	5/1036 6	106.6	17.3	104.0	-0.8	CL WITH SA
1043	08-08-91	5622.4	1565	30	114.1	12.9	5/1043 6	112.2	15.5	101.7	-2.6	CL WITH SA
1052	08-08-91	5620.7	1450	30	117.0	13.9	5/1052 6	110.8	15.0	105.6	-1.1	CL WITH SA
1061	08-10-91	5624.9	1560	10	117.7	12.8	5/1061 6	112.8	15.0	104.3	-2.2	CL WITH SA
1064	08-10-91	5617.6	1350	-3	114.2	14.5	H/974	108.0	17.6	105.7	**-3.1**	CL WITH SA
1071	08-12-91	5626.6	1550	15	113.1	16.2	H/786	112.0	16.3	101.0	-0.1	SA CL WITH GR
1074	08-12-91	5626.0	1350	-12	111.4	16.6	5/1074 6	109.8	16.7	101.5	-0.1	SA CL
1078	08-12-91	5629.7	1800	90	112.2	16.5	5/1078 6	108.6	17.8	103.3	-1.3	CL WITH SA
1083	08-13-91	5629.2	1580	12	116.4	14.4	4/1063 6	111.1	16.2	104.8	-1.8	CL WITH SA
1085	08-14-91	5627.0	1505	6	109.3	16.5	H/1074	109.8	16.7	99.5	-0.2	CL WITH SA
1096	08-14-91	5613.8	2025	-6	106.0	19.2	4/1096 6	105.6	18.9	100.4	0.3	CL WITH SA
1098	08-17-91	5632.2	1610	25	108.7	17.5	H/918	106.9	17.4	101.7	0.1	CL
1112	08-19-91	5634.3	1615	45	108.5	17.3	H/1096	105.6	18.9	102.7	-1.6	CL WITH SA
1122	08-20-91	5635.7	1675	20	112.4	17.8	H/833	113.4	15.6	99.1	**2.2**	SA CL
1130	08-21-91	5635.8	1750	25	115.6	14.8	5/1130 6	107.9	16.8	107.1	-2.0	CL WITH SA
1144	08-22-91	5634.2	1415	0	102.7	19.1	H/1014	104.6	18.0	98.2	**1.1**	GR CL WITH SA
1153	08-23-91	5639.0	1625	-10	111.5	15.8	4/1153 6	111.0	16.0	100.5	-0.2	CL WITH SA
1193	08-24-91	5629.9	1925	25	111.1	17.8	H/1014	104.6	18.0	106.2	-0.2	SA CL WITH GR
1237	08-30-91	5634.0	1875	-25	110.2	16.6	4/1237 6	115.4	12.8	95.5	**3.8**	GR CL WITH SA
1242	08-31-91	5622.6	2050	-20	112.6	15.0	H/1071	112.0	16.3	100.5	-1.3	GR CL WITH SA
1253	08-31-91	5641.7	1725	-10	91.0	16.6	5/1253 6	105.3	19.2	**86.4**	-2.6	CL WITH SA
1258	09-04-91	5634.5	1900	-20	105.7	18.2	H/1240	105.0	19.0	100.7	-0.8	GR CL WITH SA
1271	09-05-91	5639.3	1850	0	116.6	14.5	4/1271 6	107.7	17.7	108.3	**-3.2**	SA CL
1253A	09-05-91	5641.7	1725	-10	114.1	15.8	H/1253	105.3	19.2	108.4	**-3.4**	CL WITH SA
1300	09-15-91	5643.7	1500	-17	114.6	15.8	4/1300 6	112.3	14.9	102.0	0.9	SA CL
1301	09-15-91	5633.5	2000	0	107.3	17.6	H/1271	107.7	17.7	99.6	-0.1	CL WITH SA
1304	09-17-91	5644.2	1850	-6	111.8	17.5	4/1304 6	104.8	19.8	106.7	-2.3	SA CL
1312	09-18-91	5643.3	1968	52	110.5	14.8	4/1312 6	105.0	16.4	105.2	-1.6	SA CL
1319	09-20-91	5643.4	2078	-2	110.7	17.3	3/1319 6	105.9	18.5	104.5	-1.2	CL WITH SA
1327	09-21-91	5649.2	1473	24	102.4	18.7	4/1327 6	107.0	18.5	95.7	0.2	CL WITH SA
1329	09-22-91	5646.1	2140	-6	112.0	15.0	4/1329 6	110.3	15.9	101.5	-0.9	GR CL WITH SA
1343	09-24-91	5653.5	1288	24	107.7	17.6	4/1343 6	105.3	19.5	102.3	-1.9	CL WITH SA
1345	09-24-91	5652.5	1747	23	107.0	13.0	4/1345 6	105.2	17.5	101.7	**-4.5**	SA CL
1353	09-26-91	5653.1	1494	24	112.9	16.8	4/1353 6	106.7	18.8	105.8	-2.0	CL
1359	09-27-91	5651.7	1607	-6	111.5	18.1	4/1359 6	107.4	17.0	103.8	**1.1**	GR CL WITH SA
1365	09-29-91	5658.2	2260	6	111.6	16.4	4/1365 6	111.9	14.9	99.7	**1.5**	SA CL WITH GR
1370	09-30-91	5657.7	1643	-17	115.5	15.7	4/1370 6	107.7	17.1	107.2	-1.4	CL WITH SA
1373	10-01-91	5658.0	1864	-16	111.9	15.7	5/1373 6	108.1	17.7	103.5	-2.0	SA CL
1395	10-03-91	5658.1	1720	-12	110.7	18.7	4/1395 6	107.1	18.1	103.4	0.6	CL WITH SA
1420	10-08-91	5663.2	2250	-20	106.2	17.4	4/1420 6	104.9	18.8	101.2	-1.4	CL
1424	10-09-91	5663.1	1290	42	106.9	19.4	4/1424 6	103.2	21.1	103.6	-1.7	CL
1429	10-10-91	5661.9	1597	-7	110.7	18.1	4/1429 6	106.4	18.0	104.0	0.1	CL
1457	10-11-91	5663.1	1397	24	101.8	19.2	4/1457 6	106.4	18.9	95.7	0.3	CL WITH SA
1463	10-12-91	5664.3	1724	10	112.2	16.4	4/1463 6	109.3	17.5	102.7	-1.1	CL WITH SA
1478	10-16-91	5667.1	1657	18	111.5	16.6	4/1478 6	105.7	19.1	105.5	-2.5	CL
1507	10-22-91	5669.7	1725	10	108.8	18.1	4/1507 6	106.2	18.4	102.4	-0.3	CL
1613	04-15-92	5668.9	1850	24	106.4	14.1	4/1613 6	108.3	17.2	98.2	**-3.1**	CL WITH SA
1631	04-17-92	5670.7	2012	6	107.1	19.4	5/1631 6	105.4	19.1	101.6	0.3	CL WITH SA
1613A	04-17-92	5668.9	1850	24	110.8	16.9	H/1613	108.3	17.2	102.3	-0.3	CL WITH SA
1632	04-20-92	5665.7	2321	0	106.5	19.0	H/1632A	106.1	19.5	100.4	-0.5	CL WITH SA
1636	04-21-92	5670.0	1623	-1	109.9	18.3	4/1636 6	108.2	18.4	101.6	-0.1	CL WITH SA

TEST NUMBER	DATE	ELEV	LOCATION STATION	LOCATION OFFSET	FIELD DRY DENS (PCF)	FIELD MC %	STANDARD LAB COMPACTION TEST METH	STANDARD LAB COMPACTION MX DRY DEN	STANDARD LAB COMPACTION OMC %	PERCENT COMPACTION	PERCENT +- OMC	CLASSIFICATION
1637	04-24-92	5672.9	2100	0	106.8	18.7	4/1637 6	107.1	18.6	99.7	0.1	CL WITH SA
1641	04-26-92	5671.7	2279	-30	110.3	17.5	3/1641 6	109.2	17.8	101.0	-0.3	CL WITH SA
1649	04-27-92	5668.5	1261	23	106.3	17.8	4/1649 6	110.6	17.1	96.1	0.7	CL WITH SA
1655	04-27-92	5676.1	2375	-14	107.9	17.9	4/1655 6	111.3	17.0	96.9	0.9	CL WITH SA
1668	04-29-92	5676.5	1627	0	109.5	19.3	4/1668 6	110.2	17.1	99.4	2.2	CL WITH SA
1669	04-29-92	5672.6	1254	31	102.4	22.9	4/1669 6	102.9	21.5	99.5	1.4	CL
1676	05-01-92	5673.8	1500	-15	105.9	19.4	4/1676 6	105.2	20.5	100.7	-1.1	CL WITH SA
1686	05-03-92	5680.2	2085	-15	105.3	19.9	4/1686 6	108.9	18.5	96.7	1.4	CL WITH SA
1699	05-06-92	5679.2	1488	1	107.3	19.6	5/1699 6	107.6	19.1	99.7	0.5	CL WITH SA
1720	05-14-92	5683.7	1990	0	105.4	20.1	4/1720 6	104.0	20.6	101.3	-0.5	CL WITH SA
1724	05-15-92	5683.8	1240	4	99.3	22.0	4/1724 6	102.2	21.3	97.2	0.7	CL WITH SA
1727	05-16-92	5685.0	2290	25	112.0	14.8	3/1727 6	108.9	17.2	102.8	-2.4	CL WITH SA
1731	05-17-92	5687.0	1849	2	108.0	18.4	4/1731 6	106.1	19.0	101.8	-0.6	CL
1741	05-19-92	5686.0	1425	0	110.7	14.6	4/1741 6	110.3	17.4	100.4	-2.8	CL
1751	05-27-92	5688.7	2425	-6	107.1	17.5	4/1751 6	109.2	17.9	98.1	-0.4	CL WITH SA
1755	05-27-92	5687.7	1235	15	104.4	16.8	4/1755 6	107.5	18.5	97.1	-1.7	CL WITH SA
1757	05-27-92	5688.6	2175	0	115.7	14.6	4/1757 6	110.8	16.6	104.4	-2.0	CL WITH SA
1766	05-29-92	5690.2	2100	0	110.7	18.2	4/1766 6	108.1	18.3	102.4	-0.1	CL WITH SA
1778	05-31-92	5689.5	2220	-11	111.2	17.8	5/1778 6	108.9	18.2	102.1	-0.4	CL
1797	06-04-92	5691.8	1603	0	108.6	18.0	4/1797 6	108.3	17.7	100.3	0.3	CL WITH SA
1799	06-04-92	5690.1	1228	25	110.2	19.2	4/1799 6	108.4	17.7	101.7	1.5	CL WITH SA
1811	06-06-92	5691.6	1225	-8	105.7	20.7	4/1811 6	107.1	19.2	98.7	1.5	CL WITH SA
1822	06-09-92	5694.7	1700	0	106.5	18.0	4/1822 6	104.3	20.4	102.1	-2.4	CL WITH SA
1834	06-10-92	5697.5	1400	-12	104.3	19.6	4/1834	107.7	18.5	96.8	1.1	GR CL WITH SA
1838	06-11-92	5696.7	2453	7	101.9	22.6	4/1838 6	106.0	19.9	96.1	2.7	CH WITH SA
1864	06-20-92	5700.5	1900	23	109.4	18.0	4/1864 6	108.9	18.3	100.5	-0.3	CL WITH SA
1876	06-23-92	5701.0	2196	-11	106.4	17.2	4/1876 6	106.6	18.5	99.8	-1.3	CL WITH SA
1889	06-25-92	5702.8	1724	0	105.7	15.1	4/1889 6	106.0	19.0	99.7	-3.9	CL WITH SA
1891	06-25-92	5702.7	1639	-6	105.1	21.2	4/1891 6	104.5	20.4	100.6	0.8	CL WITH SA
1894	06-25-92	5702.6	1215	-14	108.9	17.3	4/1894 6	109.0	17.6	99.9	-0.3	SA CL
1907	06-27-92	5704.4	1202	19	107.4	15.5	4/1907 6	109.1	17.0	98.4	-1.5	CL WITH SA
1913	06-28-92	5706.8	2099	-10	108.6	17.5	4/1913 6	109.0	17.8	99.6	-0.3	CL WITH SA
1927	07-01-92	5710.3	1900	0	104.7	21.5	4/1927 6	109.1	18.1	96.0	3.4	CL WITH SA
1931	07-02-92	5706.3	1201	25	117.2	13.4	4/1931 6	110.9	16.8	105.7	-3.4	CL WITH SA
1939	07-03-92	5704.8	2300	0	110.2	17.0	4/1939 6	110.5	16.7	99.7	0.3	CL WITH SA
1958	07-08-92	5711.1	2254	14	109.4	15.6	4/1958 6	105.5	18.4	103.7	-2.8	CL
1963	07-09-92	5711.8	1400	0	108.7	15.8	4/1963 6	106.3	18.5	102.3	-2.7	CL WITH SA
1970	07-10-92	5710.4	1195	12	99.3	22.4	4/1970 6	101.3	21.6	98.0	0.8	CL
1987	07-16-92	5711.2	1694	9	105.8	19.6	4/1987 6	105.3	19.9	100.5	-0.3	CL WITH SA
1995	07-18-92	5714.7	2519	27	102.7	21.3	4/1995 6	105.9	19.8	97.0	1.5	CL WITH SA
2020	07-21-92	5721.3	2085	1	108.5	17.3	4/2020 6	108.7	17.6	99.8	-0.3	CL WITH SA
2033	07-23-92	5722.4	2086	-2	109.2	17.8	4/2033 6	110.5	17.5	98.8	0.3	CL WITH SA
2043	07-27-92	5722.2	2458	10	111.8	17.0	4/2043 6	111.0	16.1	100.7	0.9	CL
2055	07-28-92	5725.8	2552	-13	102.0	20.3	4/2055 6	108.0	18.6	94.4	1.7	CL
2057	07-28-92	5730.0	1630	-3	106.1	19.5	4/2057 6	107.6	18.9	98.6	0.6	CL
2063	07-29-92	5728.7	1998	-12	107.0	16.7	4/2063 6	108.3	18.2	98.8	-1.5	CL WITH SA
2086	08-01-92	5729.0	1250	21	103.6	22.7	4/2086 6	110.0	17.5	94.2	5.2	CL WITH SA
2093	08-03-92	5732.0	1430	-10	110.3	16.8	4/2093 6	107.3	18.0	102.8	-1.2	CL WITH SA
2112	08-04-92	5734.6	1847	14	99.9	20.2	4/2112	110.2	16.0	90.7	4.2	GR CL WITH SA
2118	08-05-92	5735.6	1927	7	110.1	17.5	4/2118 6	109.9	17.3	100.2	0.2	CL WITH SA
2120	08-06-92	5734.6	1859	-9	104.7	20.2	4/2120 6	109.5	18.3	95.6	1.9	CL WITH SA
2127	08-07-92	5736.5	1149	-2	96.7	23.6	4/2127 6	105.2	19.7	91.9	3.9	CL WITH SA

QUALITY ACCEPTANCE TESTING - COMPACTION REPORT REPORT NUMBER: IC.2

TEST NUMBER	DATE	ELEV	LOCATION STATION	LOCATION OFFSET	FIELD DRY DENS (PCF)	FIELD MC %	STANDARD LAB COMPACTION TEST METH	STANDARD LAB COMPACTION MX DRY DEN	STANDARD LAB COMPACTION OMC %	PERCENT COMPACTION	PERCENT +- OMC	CLASSIFICATION
2130	08-10-92	5734.7	2399	1	106.6	18.4	4/2130 6	105.1	18.6	101.4	-0.2	CL WITH SA
2134	08-11-92	5739.8	2111	-8	107.7	18.4	4/2134 6	108.1	18.8	99.6	-0.4	CL WITH SA
2137	08-11-92	5738.2	1389	-3	106.0	19.2	4/2137 6	108.2	18.5	98.0	0.7	CL WITH SA
2146	08-12-92	5743.2	1850	1	99.7	19.9	4/2146 6	104.1	20.1	95.8	-0.2	CL WITH SA
2175	08-14-92	5744.2	1646	0	103.3	21.2	4/2175 6	107.8	18.0	95.8	***3.2***	CL WITH SA
2178	08-15-92	5740.4	2589	19	107.3	18.5	4/2178 6	109.1	17.4	98.4	***1.1***	CL WITH SA
2183	08-15-92	5744.4	1139	9	111.2	16.9	4/2183 6	112.0	15.8	99.3	***1.1***	SA CL
2188	08-17-92	5747.0	1665	-9	114.6	15.4	4/2188 6	113.8	15.2	100.7	0.2	SA CL
2196	08-18-92	5744.9	2399	16	108.3	18.0	4/2196 6	107.3	18.0	100.9	0.0	CL WITH SA
2204	08-20-92	5744.0	2516	-2	110.3	16.6	4/2204 6	112.4	16.2	98.1	0.4	CL WITH SA
2215	08-22-92	5749.8	2622	-4	99.5	19.7	4/2215 6	102.8	20.6	96.8	-0.9	CL WITH SA
2219	08-24-92	5752.1	1922	3	108.2	18.5	4/2219 6	109.0	17.6	99.3	0.9	CL WITH SA
2227	08-25-92	5752.5	1246	2	116.9	16.4	4/2227 6	112.0	16.0	104.4	0.4	CL WITH SA
2231	08-26-92	5755.8	1841	-5	114.0	17.0	4/2231 6	117.1	13.6	97.4	***3.4***	SA CL
2240	08-28-92	5757.2	1123	18	102.6	20.3	4/2240 6	106.4	19.4	96.4	0.9	CL WITH SA
2247	08-28-92	5756.9	2414	2	114.9	13.5	4/2247 6	120.7	12.2	95.2	***1.3***	SA CL
2256	08-30-92	5760.0	1426	-2	116.0	15.1	4/2256 6	109.3	15.5	106.1	-0.4	SA CL
2266	09-02-92	5761.7	2159	-6	114.2	15.1	4/2266 6	111.9	16.0	102.1	-0.9	CL WITH SA
2269	09-02-92	5764.7	1110	-11	109.3	18.2	4/2269 6	107.8	18.8	101.4	-0.6	CL WITH SA
2272	09-03-92	5765.5	1698	10	109.6	17.6	4/2272 6	105.5	19.6	103.9	-2.0	CL WITH SA
2273	09-03-92	5763.2	1297	-13	109.5	18.1	4/2273 6	111.1	16.9	98.6	***1.2***	CL WITH SA
2276	09-08-92	5766.3	1995	10	112.3	15.5	4/2276 6	113.4	15.7	99.0	-0.2	CL WITH SA
2281	09-09-92	5768.5	1930	13	110.3	17.2	4/2281 6	111.1	16.7	99.3	0.5	CL WITH SA
2286	09-09-92	5769.2	2679	-3	111.3	16.3	4/2286 6	112.8	15.8	98.7	0.5	SA CL
2291	09-10-92	5769.4	1954	-5	112.1	16.7	4/2291 6	112.4	16.0	99.7	0.7	CL WITH SA
2303	09-12-92	5772.7	1725	-6	114.6	14.1	4/2303	111.9	15.3	102.4	-1.2	SA CL WITH GR
2304	09-12-92	5768.9	1090	2	105.9	19.3	4/2304 6	107.9	19.3	98.1	0.0	CL WITH SA
2311	09-14-92	5771.6	2617	-4	102.0	19.5	4/2311 6	106.7	18.5	95.6	1.0	CL WITH SA
2319	09-15-92	5777.1	1139	3	113.6	15.7	4/2319 6	113.7	16.0	99.9	-0.3	CL WITH SA
2329	09-17-92	5781.9	1500	-7	109.5	18.5	4/2329 6	108.6	18.0	100.8	0.5	CL WITH SA
2331	09-17-92	5781.4	1082	13	107.4	17.3	4/2331 6	107.9	18.0	99.5	-0.7	CL WITH SA
2335	09-18-92	5782.7	2289	-2	108.8	15.3	4/2335 6	108.9	17.9	99.9	-2.6	CL WITH SA
2340	09-19-92	5779.4	2658	-3	100.2	13.2	4/2340	107.8	16.9	***92.9***	***-3.7***	GR CL WITH SA
2341	09-19-92	5783.3	1076	4	106.5	20.6	4/2341 6	106.9	18.7	99.6	***1.9***	CL WITH SA
2342	09-20-92	5785.8	1252	-1	108.5	17.7	4/2342 6	107.4	18.0	101.0	-0.3	SA CL
2347	09-21-92	5789.1	1575	1	107.8	16.6	4/2347 6	106.7	18.3	101.0	-1.7	CL WITH SA
2354	09-22-92	5788.4	2409	0	104.4	18.7	4/2354 6	103.7	20.1	100.7	-1.4	CL WITH SA
2357	09-23-92	5782.3	2680	-7	116.8	15.0	4/2357 6	113.5	15.4	102.9	-0.4	CL WITH SA
2361	09-24-92	5796.2	1984	5	108.2	16.9	4/2361 6	113.7	15.5	95.2	***1.4***	CL WITH SA
2366	09-25-92	5792.6	1060	12	110.1	17.6	4/2366 6	111.6	16.8	98.7	0.8	CL WITH SA
2371	09-26-92	5790.9	2587	3	110.6	16.5	4/2371 6	107.1	19.1	103.3	-2.6	CL WITH SA
2373	09-26-92	5791.0	2751	13	112.0	17.4	4/2373 6	112.7	16.0	99.4	***1.4***	CL WITH SA
2375	09-28-92	5796.6	2628	-5	107.3	16.4	4/2375 6	110.0	17.6	97.5	-1.2	CL WITH SA
2378	09-29-92	5804.2	1897	-1	111.3	16.3	4/2378 6	109.6	17.5	101.6	-1.2	CL WITH SA
2380	09-30-92	5803.7	1250	0	127.7	10.5	4/2380	122.4	11.2	104.3	-0.7	SC WITH GR
2382	09-30-92	5802.0	1047	0		15.7						SA CL
2385	10-02-92	5806.5	1405	2	103.6	20.8	4/2385 6	107.5	18.5	96.4	***2.3***	CL WITH SA
2388	10-05-92	5810.0	1613	0	100.0	23.6	4/2388 6	102.8	21.6	97.3	***2.0***	CL WITH SA
2391	10-06-92	5809.5	1045	-5	103.4	20.8	4/2391 6	106.3	19.3	97.3	***1.5***	CL WITH SA
2394	10-07-92	5807.9	2775	-5	108.0	17.6	4/2394 6	106.4	17.1	101.5	0.5	CL WITH SA
2395	10-08-92	5808.3	2442	0	108.4	16.5	4/2395 6	108.7	17.8	99.7	-1.3	CL WITH SA

TEST NUMBER	DATE	ELEV	LOCATION		FIELD		STANDARD LAB COMPACTION			PERCENT COMPACTION	PERCENT +- OMC	CLASSIFICATION
			STATION	OFFSET	DRY DENS (PCF)	MC %	TEST METH	MX DRY DEN	OMC %			

NOTE: Explanation of Column Headed TEST METH - 5/110 6

This indicates lab comparison type

5 - 5 point proctor
1 or 2 - 1 or 2 point proctor
H - historical proctor
A - abutment test

All mold diameters are 12 inch unless noted here.

proctor number used for comparison to field data

IN-PLACE - TEST RANGES FOR TESTS IN EMBANKMENT FOR THIS REPORT

FIELD DRY DENSITY MIN	96.7	FIELD M.C. MIN	10.5	AVGERAGE PERCENT COMPACTION THIS REPORT	100.7
FIELD DRY DENSITY MAX	127.7	FIELD M.C. MAX	23.6	PERCENT COMPACTIONS <95% AND >93% THIS REPORT	1.6
FIELD DRY DENSITY AVG	108.5	FIELD M.C. AVG	17.6	PERCENT COMPACTIONS <93% THIS REPORT	1.6

LAB - CUMULATIVE 3,4,5 POINT PROCTOR RANGE - ALL TESTS TO 12-31-92

				AVERAGE PERCENT COMPACTION TO 12-31-92	100.7
MAX. DRY DENSITY MIN	99.0	O.M.C. MIN	11.2	PERCENT COMPACTIONS <95% AND >93% TO 12-31-92	1.6
MAX. DRY DENSITY MAX	122.4	O.M.C. MAX	22.6	PERCENT COMPACTIONS <93% TO 12-31-92	1.6
MAX. DRY DENSITY AVG	107.8	O.M.C. AVG	18.0		

COMMENT: THIS REPORT COVERS THE ENTIRE CONSTRUCTION OF THE DAM.

LAB CHIEF: ____________________ SUBMITTED BY: ____________________
PROJECT ENGINEER

Note: Abutment Moisture Band is OMC ±1%

PROJECT: LITTLE DELL LAKE, DAM AND APPURTENANCES RIVER: SALT LAKE CITY STREAMS STATE: UTAH TOWN: SALT LAKE CITY	CONTRACT NO. DACW05-89-C-0045 CONTRACTOR: CLEMENT BROTHERS AND J.E. STARNES CO.	DATE OF REPORT: 12-08-92 01-01-90 THRU 12-31-92

EMBANKMENT ZONE	MIN. DESIGNED % COMP	SPEC. W.C. % RANGE	LOOSE LIFT THICK. (IN)	NUMBER OF PASSES	COMPACTION EQUIPMENT
IMPERVIOUS	95	-3 TO 1	8	6	CAT 825C, 980, 950

TEST NUMBER	TEST IN SPEC	STATUS FAILED TESTS	TEST COMMENTS
478	Y		SOURCE-RBA OLD ALLUVIUM. PROCTOR & DENSITY. FIRST IN PLACE DENSITY.
481	Y		SOURCE-RBA OLD ALLUVIUM. PROCTOR & DENSITY. MC IS LOW BUT ACCEPTABLE.
485	Y		SOURCE-RBA OLD ALLUVIUM. PROCTOR & DENSITY.
488	Y		SOURCE-RBA OLD ALLUVIUM. PROCTOR & DENSITY.
492	Y		SOURCE-RBA OLD ALLUVIUM. PROCTOR & DENSITY.
495	Y		SOURCE-RBA OLD ALLUVIUM. PROCTOR & DENSITY.
502	Y		SOURCE-RBA OLD ALLUVIUM. PROCTOR & DENSITY. FIRST USE OF THE CAT 825C.
505	Y		SOURCE-RBA OLD ALLUVIUM. PROCTOR & DENSITY.
513	Y		SOURCE-RBA OLD ALLUVIUM. PROCTOR & DENSITY.
514	N	OLM	SOURCE-RBA OLD ALLUVIUM. PROC.&DENS. MC IS LOW. MATERIAL ACCEPTED BASED ON FIELD UNITS OBSERVATION & JUDGEMENT.
518	Y		SOURCE-RBA OLD ALLUVIUM. PROCTOR & DENSITY.
537	Y		SOURCE-RBA OLD ALLUVIUM. PROCTOR & DENSITY.
540	N	OLM	SOURCE-RBA OLD ALLUVIUM. PROCTOR & DENSITY. MC IS HIGH BUT MATERIAL ACCEPTED.
547	N	RW	SOURCE-RBA OLD ALLUVIUM. PROCTOR & DENSITY. LIFT FROZEN THEN REWORKED BEFORE ADDING A LIFT.
549	N	OLM	SOURCE-RBA. DENS. AT LEFT ABUT. WHEEL ROLLED WITH LOADER.HIGH MC. MATERIAL ACCEPTED BASED ON LOCATION.
566	N	OLM	SOURCE-RBA PROCTOR & DENSITY. MC IS SLIGHTLY HIGH.
568	Y		SOURCE-RBA. DENSITY RETEST FOR TEST 567. DENSITY ONLY. GRADATION SAME AS NO.567.
570	Y		SOURCE-RBA. PROCTOR & DENSITY.
587	Y		SOURCE-RBA. DENSITY & GRADATION.
867	N	OLM	SOURCE-FINE GRAINED STOCKPILE AREA. DENS.GRAD.TESTS ON MATERIAL REWORKED AND COMPACTED IN PLACE. FIRST IC TESTING.
869	Y		SOURCE-FINE GRAINED STOCKPILE AREA. DENS.GRAD.PROCTOR,CAT825-C/CARON. FIRST TEST OF NEW MATERIAL. 2PT MATCH.
874	Y		SOURCE-FINE GRAINED STOCKPILE AREA. DENS.GRAD.PROCTOR.CAT825C/CARON.
880	Y		SOURCE-FINE GRAINED STOCKPILE AREA. DENS.GRAD.PROCTOR.CAT825C/CARON.
881	Y		SOURCE-FINE GRAINED STOCKPILE AREA. DENS.GRAD.PROCTOR.INITIAL LIFTS COMPACTED WITH 950 LOADER
889	Y		SOURCE-FINE GRAINED STOCKPILE AREA. DENS.GRAD.PROCTOR.SPF60.
895	Y		SOURCE-FINE GRAINED STOCKPILE AREA. DENS.GRAD.PROCTOR.3FT PLUS.SPF60.
911	Y		SOURCE-FINE GRAINED STOCKPILE AREA. DENS.GRAD.PROCTOR,2PT MATCH.SPF60.
918	Y		SOURCE-FINE GRAINED STOCKPILE AREA. DENS.GRAD.PROCTOR.SPF60.
927	N	OLM	SOURCE- NOT STATED. DENS.GRAD.PROCTOR.RIGHT ABUTMENT,WHEEL ROLLED W FRONT END LOADER,870 OR 950.
928	Y		SOURCE-FINE GRAINED STOCKPILE AREA. DENS.GRAD.PROCTOR.SPF60.
932	N	OLM	SOURCE-FINE GRAINED STOCKPILE AREA. DENS.GRAD.PROCTOR.REPRESENTS 1900 TO 1950 & 50U/S TO 45D/S. SPF60.
937	Y		SOURCE-FINE GRAINED STOCKPILE AREA. DENS.GRAD.PROCTOR.CAT 950 LOADER. LEFT ABUTMENT.
945	N	OLM	SOURCE-FINE GRAINED STOCKPILE AREA. DENS.GRAD.PROCTOR.CAT 825.
948	Y		SOURCE-FINE GRAINED STOCKPILE AREA. DENS.GRAD.PROCTOR.CAT825.
951	N	OLM	SOURCE-NOT SPECIFIC. DENS.GRAD.PROCTOR. CAT825
960	N	OLM	SOURCE-NOT SPECIFIC. DENS.GRAD.PROCTOR. CAT825.
966	N	OLD	SOURCE-NOT SPECIFIC. DENS.GRAD.PROCTOR.CAT825. NEAR ABUTMENT.
975	Y		SOURCE-FINE GRAINED STOCKPILE AREA. DENS.GRAD.PROCTOR.CAT825
976	N	OLD	SOURCE-NOT SPECIFIC. DENS.GRAD.PROCTOR. CAT825. REPRESENTS 1370 TO 2000 & FULL WIDTH.
984	N	OLM	SOURCE-NOT SPECIFIC. DENS.GRAD.PROCTOR. CAT 825
986	Y		SOURCE-NOT SPECIFIC. DENS.GRAD.PROCTOR. CAT825
1005	Y		SOURCE-NOT SPECIFIC. DENS.GRAD.PROCTOR. CAT825.
1012	Y		SOURCE-NOT SPECIFIC. DENS.GRAD.PROCTOR. CAT825

TEST NUMBER	TEST IN SPEC	STATUS FAILED TESTS	TEST COMMENTS
1027	Y		SOURCE-NOT SPECIFIC. DENS.GRAD.PROCTOR. CAT825.
1036	Y		SOURCE-NOT SPECIFIC. DENS.GRAD.PROCTOR. CAT825.
1043	Y		SOURCE-NOT SPECIFIC. DENS.GRAD.PROCTOR. CAT825.
1052	Y		SOURCE-NOT SPECIFIC. DENS.GRAD.PROCTOR. CAT825.
1061	Y		SOURCE-NOT STATED. DENS.GRAD.PROCTOR. CAT825.
1064	N	OLM	SOURCE-NOT SPECIFIC. DENS.GRAD. LEFT ABUTMENT. WHEEL ROLLED WITH TCM 870 LOADER.
1071	Y		SOURCE-NOT SPECIFIC. DENS.GRAD. CAT825.
1074	Y		SOURCE-NOT SPECIFIC. DENS.GRAD.PROCTOR.LEFT ABUTMENT.WHEEL ROLLED WITH TCM 870 LOADER.
1078	Y		SOURCE-NOT STATED. DENS.GRAD.PROCTOR. CAT825.
1083	Y		SOURCE-NOT SPECIFIC. DENS.GRAD.PROCTOR. CAT825.
1085	Y		SOURCE-NOT SPECIFIC. DENS.GRAD. CAT825.
1096	Y		SOURCE-FINE GRAINED STOCKPILE AREA. DENS.GRAD.PROCTOR.WHEEL ROLLED WITH 870 LOADER. RIGHT ABUTMENT BOTTOM 3FT.
1098	Y		SOURCE-NOT STATED. DENS.GRAD. CAT825.
1112	Y		SOURCE-NOT SPECIFIC. DENS.GRAD.CAT825. FIELD DENSITY TAKEN AT THE SURFACE AFTER SEALING OFF WITH THE SCRAPERS.
1122	N	OLM	SOURCE-FINE GRAINED STOCKPILE AREA. DENS.GRAD. CAT825.SEE RETEST OF THE FIELD DENSITY, 1122A.
1130	Y		SOURCE-NOT SPECIFIC. DENS.GRAD.PROCTOR. CAT825. SEE RETEST OF THE FIELD DENSITY, 1130A.
1144	N	OLM	SOURCE-NOT SPECIFIC. DENS.GRAD. CAT825.
1153	Y		SOURCE-NOT STATED. DENS.GRAD.PROCTOR. CAT825.
1193	Y		SOURCE-NOT SPECIFIC. DENS.GRAD. CAT825.
1237	N	OLM	SOURCE-NOT STATED. DENS.GRAD.PROCTOR. CAT825.
1242	Y		SOURCE-NOT STATED. DENS.GRAD. CAT825.
1253	N	RW,RT	SOURCE-NOT STATED. DENS.GRAD.PROCTOR. RETEST,SEE 1253A.
1258	Y		SOURCE-NOT STATED. DENS.GRAD.
1271	N	OLM	SOURCE-NOT STATED. DENS.GRAD.PROCTOR. FIELD DENSITY FROM 1271A.ORIGINAL FIELD DENSITY VOIDED, RETEST TAKEN.
1253A	N	OLM	SOURCE-NOT STATED. FIELD DENSITY ONLY. GRADATION & PROCTOR FROM 1253.
1300	Y		SOURCE-BURDETTE HAUL ROAD CUT. DENS.GRAD.PROCTOR. CAT825.
1301	Y		SOURCE-NOT STATED. DENS.GRAD. CAT825.
1304	Y		SOURCE-HIGH,LEFT SIDE,TQA. DENS.GRAD.PROCTOR. CAT825.
1312	Y		SOURCE-HIGH LEFT SIDE,TQA. DENS.GRAD.PROCTOR. CAT825.REPRESENTS SMALL PART OF LIFT PLACED, OTHER AREAS MOISTER.
1319	Y		SOURCE-HIGH LEFT SIDE,TQA. DENS.GRAD.PROCTOR.
1327	Y		SOURCE-SECTION 6. DENS.GRAD.PROCTOR.
1329	Y		SOURCE-HIGH LEFT SIDE,TQA. DENS.GRAD.PROCTOR.
1343	Y		SOURCE-NOT SPECIFIC,OLD ALLUVIUM. DENS.GRAD.PROCTOR.LEFT ABUTMENT. TCM 870 LOADER.
1345	N	OLM	SOURCE-HIGH LEFT,TQA. DENS GRAD.PROCTOR. CAT825.SEE ALSO RETESTS 1345A,B & 1359. REPRESENTS LOCALIZED 14BY40 AREA.
1353	Y		SOURCE-HIGH LEFT,TQA. DENS.GRAD.PROCTOR. CAT825.
1359	N	OLM	SOURCE-NOT STATED. DENS.GRAD.PROCTOR. RETEST OF 1345 LIFT. REPRESENTS LIFT BEYOND THE ISOLATED DRY AREA OF 1345.
1365	N	OLM	SOURCE-NOT STATED. DENS.GRAD.PROCTOR.
1370	Y		SOURCE-HIGH LEFT,TQA. DENS.GRAD.PROCTOR.
1373	Y		SOURCE-SECTION 6. DENS.GRAD.PROCTOR. CAT825.
1395	Y		SOURCE-SECTION 6. DENS.GRAD.PROCTOR. CAT825.
1420	Y		SOURCE-OLDER ALLUVIUM. DENS.GRAD.PROCTOR. NEAR RIGHT ABUTMENT. CAT825.
1424	Y		SOURCE-SECTION 6,OLDER ALLUVIUM. DENS.GRAD.PROCTOR. WHEELROLLED WITH TCM 870. TOP LIFT TESTED. LEFT ABUTMENT.
1429	Y		SOURCE-OLDER ALLUVIUM. DENS.GRAD.PROCTOR. CAT825.
1457	Y		SOURCE-SECTION 6. DENS.GRAD.PROCTOR. CAT825.
1463	Y		SOURCE-SECTION 6&7. DENS GRAD.PROCTOR. CAT825.
1478	Y		SOURCE-SECTIION 6&7. DENS.GRAD.PROCTOR. CAT825.
1507	Y		SOURCE-NOT SPECIFIC. DENS.GRAD.PROCTOR. CAT825.
1613	N	RW,RT	SOURCE-RBA 5000,RT. DENS.GRAD.PROCTOR. AREA 1800 TO 2000,0 TO 24. REWORKED,RETESTED.
1631	Y		SOURCE-RBA STA 5000,RT 300 TO 400. DENS.GRAD.PROCTOR.
1613A	Y		SOURCE-RBA STA 5000,RT. DENSITY ONLY. GRADATION FROM 1613. RETEST OF AREA 1800 TO 2000,0 TO 35.
1632	Y		SOURCE-NOT SPECIFIC. DENS.GRAD. PROCTOR FROM STOCKPILE,SEE TEST 1632A.
1636	Y		SOURCE-NOT SPECIFIC. DENS.GRAD.PROCTOR. AREA 1385 TO 1950,FULL WIDTH. CAT 825.

TEST NUMBER	TEST IN SPEC	STATUS FAILED TESTS	TEST COMMENTS
1637	Y		SOURCE-RBA 3700, 150 RT. DENS.GRAD.PROCTOR. AREA 1550 TO 2200.
1641	Y		SOURCE-RBA 3500,LFT. DENS.GRAD.PROCTOR. AREA 2260 TO RA.
1649	Y		SOURCE-RBA 3500 AT 0 RT. DENS.GRAD.PROCTOR. LEFT ABUTMENT.
1655	Y		SOURCE-RBA STA. 3300. DENS.GRAD.PROCTOR. RIGHT ABUTMENT.
1668	N	OLM	SOURCE-NOT STATED. DENS.GRAD PROCTOR. AREA 1450 TO 2300.ACCEPTED BASED ON FIELD OBSERVATIONS.
1669	N	OLM	SOURCE-RBA.3800,0 RT. DENS.GRAD.PROCTOR. LEFT ABUTMENT -3 FT.
1676	Y		SOURCE-RBA 4000 TO 4200,RT. DENS.GRAD.PROCTOR. AREA NOTSPECIFIC.
1686	N	OLM	SOURCE-RBA 4000 TO 4400,RT. DENS.GRAD.PROCTOR. AREA NOT SPECIFIC.
1699	Y		SOURCE RBA 4000 TO 4400,LFT. DENS.GRAD.PROCTOR. AREA NOT STATED.
1720	Y		SOURCE-RBA 3300,200 LFT. DENS.GRAD.PROCTOR. AREA 1300 TO 2075.
1724	Y		SOURCE-RBA 4500,400 LFT. DENS.GRAD.PROCTOR.LEFT ABUTMENT.
1727	Y		SOURCE-RBA. DENS.GRAD.PROC. AREA NOT SPECIFIC. SAND CONE PENETRATED LIFT INTERFACE.
1731	Y		SOURCE-RBA. DENS.GRAD.PROCTOR. AREA UNKNOWN.
1741	Y		SOURCE-RBA . DENS.GRAD.PROCTOR.
1751	Y		SOURCE-RBA. DENS.GRAD.PROC. NEAR RIGHT ABUTMENT.
1755	Y		SOURCE-RBA. DENS.GRAD.PROC. LEFT ABUTMENT.
1757	Y		SOURCE-RBA. DENS.GRAD.PROC. AREA 1908 TO RA.
1766	Y		SOURCE-RBA. DENS.GRAD.PROC. AREA 1300 TO 2300.
1778	Y		SOURCE-RBA. DENS.GRAD.PROC. AREA 1925 TO 2300. SEE ALSO COMPANION TEST 1779.
1797	Y		SOURCE-RBA. DENS.GRAD.PROCTOR. AREA 1300 TO 1850.
1799	N	OLM	SOURCE-RBA 4000 TO 4100,0 TO 100 RT. DENS.GRAD.PROC. LEFT ABUTMENT.
1811	N	OLM	SOURCE-RBA 5800,-100 LFT. DENS.GRAD.PROC. LEFT ABUTMENT
1822	Y		SOURCE-RBA. DENS.GRAD.PROC. AREA 1300 TO 2100.
1834	N	OLM	SOURCE-RBA. DENS.GRAD.PROC. AREA LA TO 2100.
1838	N	OLM	SOURCE-RBA. DENS.GRAD.PROC. RIGHT ABUTMENT.
1864	Y		SOURCE-RBA. DENS.GRAD.PROC. AREA NOT STATED.
1876	Y		SOURCE-RBA. DENS.GRAD.PROC. AREA RA TO 1625,32 TO -21.
1889	N	RW,RT	SOURCE-RBA. DENS.GRAD.PROC. AREA LA TO 2350.AREA REWORKED RETESTED.SEE TEST 1891.
1891	Y		SOURCE-RBA. DENS.GRAD.PROC. AREA 1550 TO 1800,32 TO -21.RETEST OF AREA REPRESENTED BY TEST 1889.
1894	Y		SOURCE-RBA 3500 & 5800,400 LFT. DENS.GRAD.PROC. LEFT ABUTMENT.
1907	Y	RW	SOURCE-RBA. DENS.GRAD.PROC. LEFT ABUTMENT.
1913	Y		SOURCE-RBA 3000 TO 3200,400 LFT. DENS.GRAD.PROC. AREA 1300 TO 2155.
1927	N	OLM	SOURCE-RBA 3500 TO 3800,300 LFT. DENS.GRAD.PROC. AREA LA TO 2200.
1931	N	OLM	SOURCE-RBA-5400 TO 5700,250 LFT. DENS.GRAD.PROC. LEFT ABUTMENT.
1939	Y		SOURCE-RBA 3200 TO 4100,450 TO 600 LFT. DENS.GRAD.PROC.AREA NOT STATED.
1958	Y		SOURCE-RBA 5300,250 RT. DENS.GRAD.PROC. AREA NOT STATED.
1963	Y		SOURCE-RBA. DENS.GRAD.PROC. AREA NOT STATED.
1970	Y		SOURCE-RBA 5600,400 LFT. DENS.GRAD.PROC. LEFT ABUTMENT.
1987	Y		SOURCE-RBA 2400 TO 2700,350 LFT. DENS.GRAD.PROC. AREA NOT STATED.
1995	N	OLM	SOURCE-RBA 2600 TO 3200,50 TO 450 LFT. DENS.GRAD.PROC. RIGHT ABUTMENT
2020	Y		SOURCE-RBA. DENS.GRAD.PROC. AREA NOT STATED.
2033	Y		SOURCE-RBA. DENS.GRAD.PROC. AREA NOT STATED.
2043	Y		SOURCE-RBA 2700,100 LFT. DENS.GRAD.PROC. AREA NOT STATED.
2055	N	OLD,M	SOURCE-RBA. DENS.GRAD.PROC. RIGHT ABUTMENT.
2057	Y		SOURCE-RBA. DENS.GRAD.PROC. AREA NOT STATED.
2063	Y		SOURCE-RBA. DENS.GRAD.PROC. AREA NOT STATED.
2086	N	OLD,M	SOURCE-RBA 2500 TO 3000,50 RT. DENS.GRAD.PROC. AREA 1160 TO 1860.SMALL AREA WAS PLUS 5,MOST OF THE LIFT WAS PLUS 2.
2093	Y		SOURCE-RBA 2599,400 LFT. DENS.GRAD.PROC. AREA NOT STATED.
2112	N	OLD,M	SOURCE-RBA. DENS.GRAD.PROC. AREA 1150 TO 1850,SMALL AREA OF THE LIFT WAS PLUS 4,MOST OF THE LIFT WAS 2. SEE 2120.
2118	Y		SOURCE-RBA 2600 TO 3200,200 LFT. DENS.GRAD.PROC. AREA NOT STATED.
2120	N	OLM	SOURCE-RBA 2500 TO 2900,200 LFT. DENS.GRAD.PROC. ADDITIONAL TEST OF 2112 LIFT. AREA 1150 TO 1890.
2127	N	OLD,M	SOURCE-RBA 2500. DENS.GRAD.PROC. LEFT ABUTMENT.

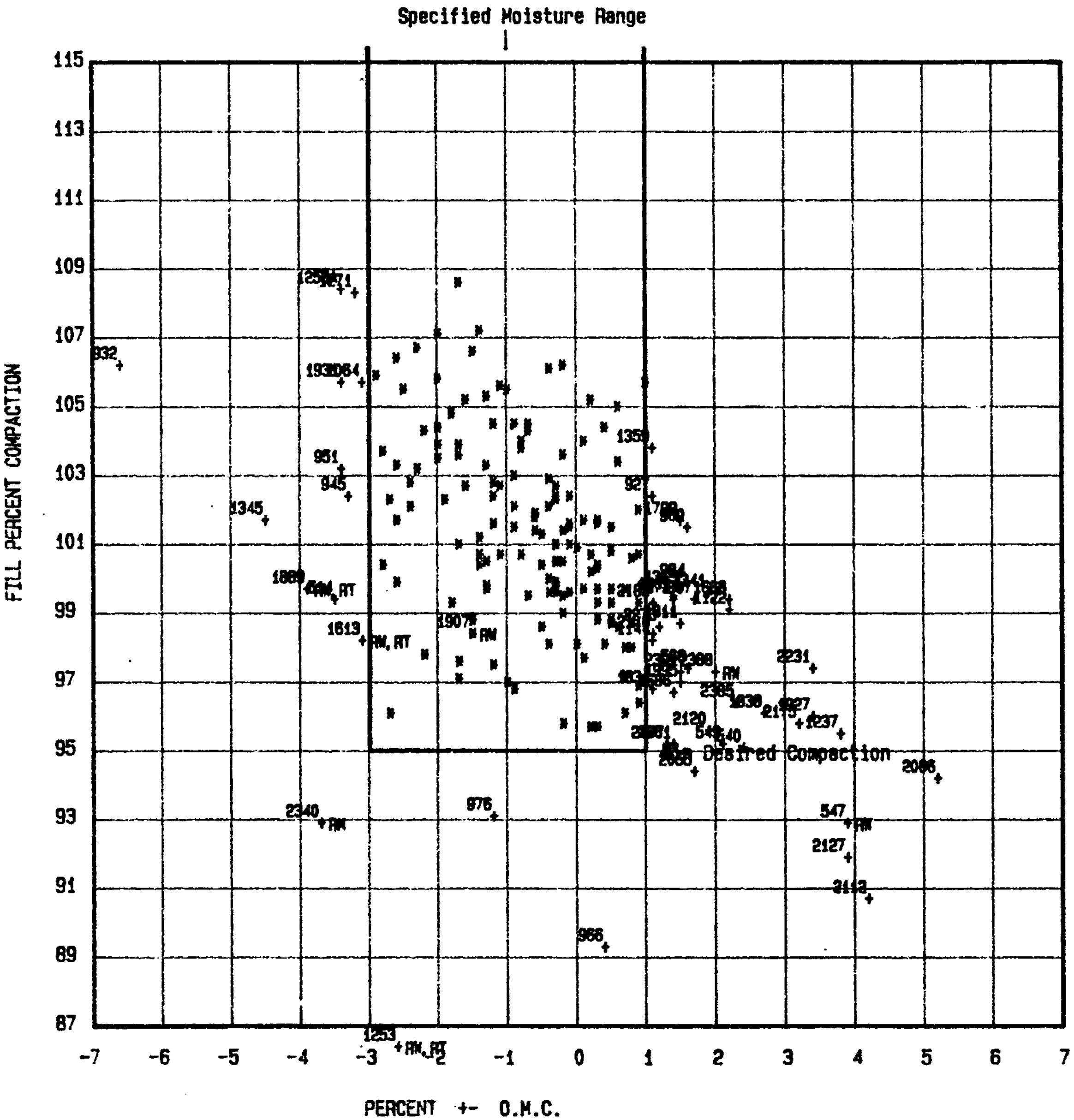
TEST NUMBER	TEST IN SPEC	STATUS FAILED TESTS	TEST COMMENTS
2130	Y		SOURCE-RBA 5150,50 LFT. DENS.GRAD.PROC.
2134	Y		SOURCE-RBA 2800 TO 4000,250 LFT TO 400 RT. DENS.GRAD.PROC.
2137	Y		SOURCE-RBA. DENS.GRAD.PROC.
2146	Y		SOURCE-RBA. DENS.GRAD.PROC.
2175	N	OLM	SOURCE-RBA. DENS.GRAD.PROC. AREA 1150 TO 1730.
2178	N	OLM	SOURCE-RBA. DENS.GRAD.PROC. RIGHT ABUTMENT.
2183	N	OLM	SOURCE-RBA 2000,200 LFT. DENS.GRAD.PROC. LEFT ABUTMENT.
2188	Y		SOURCE-RBA 2500 TO 2900,300 TO 400 LFT. DENS.GRAD.PROC.
2196	Y		SOURCE-RBA 2300 TO 2400,300 TO 550 LFT. DENS.GRAD.PROC.
2204	Y		SOURCE-RBA. DENS.GRAD.PROC.
2215	Y		SOURCE-RBA. DENS.GRAD.PROC. RIGHT ABUTMENT.
2219	Y		SOURCE-RBA 2600 TO 3000,350 LFT. DENS.GRAD.PROC.
2227	Y		SOURCE-RBA 2200 TO 2400,150 TO 500 LFT. DENS.GRAD.PROC.
2231	N	OLM	SOURCE-RBA 2100 TO 2400,150 TO 500 LFT. DENS.GRAD.PROC. AREA 1100 TO 2600.
2240	Y		SOURCE-RBA. DENS.GRAD.PROC.
2247	N	OLM	SOURCE-RBA. DENS.GRAD.PROC. AREA 2350 TO 2600.
2256	Y		SOURCE-RBA 2200 TO 2500,100 TO 450 LFT. DENS.GRAD.PROC.
2266	Y		SOURCE-RBA. DENS.GRAD.PROC.
2269	Y		SOURCE-RBA. DENS.GRAD.PROC. LEFT ABUTMENT.
2272	Y		SOURCE-RBA. DENS.GRAD.PROC.
2273	N	OLM	SOURCE-RBA. DENS.GRAD.PROC. D/S OF INSTRUMENT MOUND. AREA 1100 TO 1622. MAYBE SMALL PERCENTAGE OF THE LIFT.
2276	Y		SOURCE-RBA 1850 TO 2300,100 TO 300 LFT. DENS.GRAD.PROC.
2281	Y		SOURCE-RBA 1850 TO 2300,100 TO 300 LFT. DENS.GRAD.PROC.
2286	Y		SOURCE-RBA 2050 TO 2400,400 TO 700 LFT. DENS.GRAD.PROC.RIGHT ABUTMENT.
2291	Y		SOURCE-RBA 2050 TO 2500,100 TO 700 LFT. DENS.GRAD.PROC.
2303	Y		SOURCE-RBA 2800 TO 3100,100 RT. DENS.GRAD.PROC.
2304	Y		SOURCE-RBA 2800 TO 3100,100 RT. DENS.GRAD.PROC. LEFT ABUTMENT.
2311	Y		SOURCE-RBA 2400 TO 2700,0 TO 100 RT. DENS.GRAD.PROC. AREA 2550 TO 2680.
2319	Y		SOURCE-RBA 2200 TO 2400,200 TO 400 LFT. DENS.GRAD.PROC.
2329	Y		SOURCE-RBA 2800 TO 3150,120 RT. DENS.GRAD.PROC. AREA 1300 TO 2620.
2331	Y		SOURCE-RBA. DENS.GRAD.PROC. LEFT ABUTMENT.
2335	Y		SOURCE-RBA. DENS.GRAD.PROC.
2340	N	RM	SOURCE-4800,450 LFT. DENS.GRAD.PROC. NEAR RIGHT ABUTMENT. AREA 1625 TO 2725. NOT REPRESENTATIVE OF ENTIRE LIFT.
2341	N	OLM	SOURCE-RBA 2200 TO 2500,200 TO 300 LFT. DENS.GRAD.PROC. LEFT ABUTMENT.
2342	Y		SOURCE-RBA. DENS.GRAD.PROC.
2347	Y		SOURCE-RBA 2200 TO 2500,600 TO 700 LFT. DENS.GRAD.PROC.
2354	Y		SOURCE-RBA 2200 TO 2500,200 TO 600 LFT. DENS.GRAD.PROC.
2357	Y		SOURCE-RBA. DENS.GRAD.PROC.
2361	N	OLM	SOURCE-RBA. DENS.GRAD.PROC. AREA 1160 TO 2488.
2366	Y		SOURCE-RBA 3000,100 RT. DENS.GRAD.PROC. LEFT ABUTMENT.
2371	Y		SOURCE-RBA 3000,100 RT. DENS.GRAD.PROC.
2373	N	OLM	SOURCE-RBA 2650,650 LFT. DENS.GRAD.PROC. RIGHT ABUTMENT.
2375	Y		SOURCE-RBA 2600,100 RT & 5250,400 LFT. DENS.GRAD.PROC.
2378	Y		SOURCE-RBA 2600,150 RT. DENS.GRAD.PROC.
2380	N		SOURCE-RBA. DENS.GRAD.PROC.QUICKIE MOISTURES. QMCS 10.3,11.9,10.1. 1800 TO 2750,1 LIFT.1050 TO 1800,3 TO 4 LIFTS.
2382	Y		SOURCE-RBA. GRADATION ONLY. STOCKPILE SAMPLE, MATERIAL FOR THE LEFT ABUTMENT. FIVE LIFTS AT LEFT ABUTMENT.
2385	N	OLM	SOURCE-RBA 3350,400 LFT. DENS.GRAD.PROC. AREA 1060 TO 2750.
2388	N	RW	SOURCE-RBA 3200,450 LFT. DENS.GRAD.PROC. AREA 1050 TO 1800. AREA REWORKED.
2391	N	OLM	SOURCE-RBA 3200,450 LFT. DENS.GRAD.PROC. LEFT ABUTMENT.
2394	Y		SOURCE-RBA. DENS.GRAD.PROC. RIGHT ABUTMENT.
2395	Y		SOURCE-RBA 2800 TO 2900,500 LFT. DENS.GRAD.PROC.

QUALITY ACCEPTANCE TESTING - COMMENTS REPORT			REPORT NUMBER: IC.3	PAGE 5 OF 5
TEST NUMBER	TEST IN SPEC	STATUS FAILED TESTS	TEST COMMENTS	

COMMENT: THIS REPORT COVERS THE ENTIRE CONSTRUCTION OF THE DAM.

LAB CHIEF: ____________________

SUBMITTED BY: ____________________
PROJECT ENGINEER



PROJECT: LITTLE DELL LAKE, DAM AND APP.
DISTRICT: CESPK
DATE OF REPORT : 12-08-1992
REPORT PERIOD : 01-01-90 thru 12-31-92
REPORT NUMBER : IC.4
TYPE OF MATERIAL: IMPERVIOUS

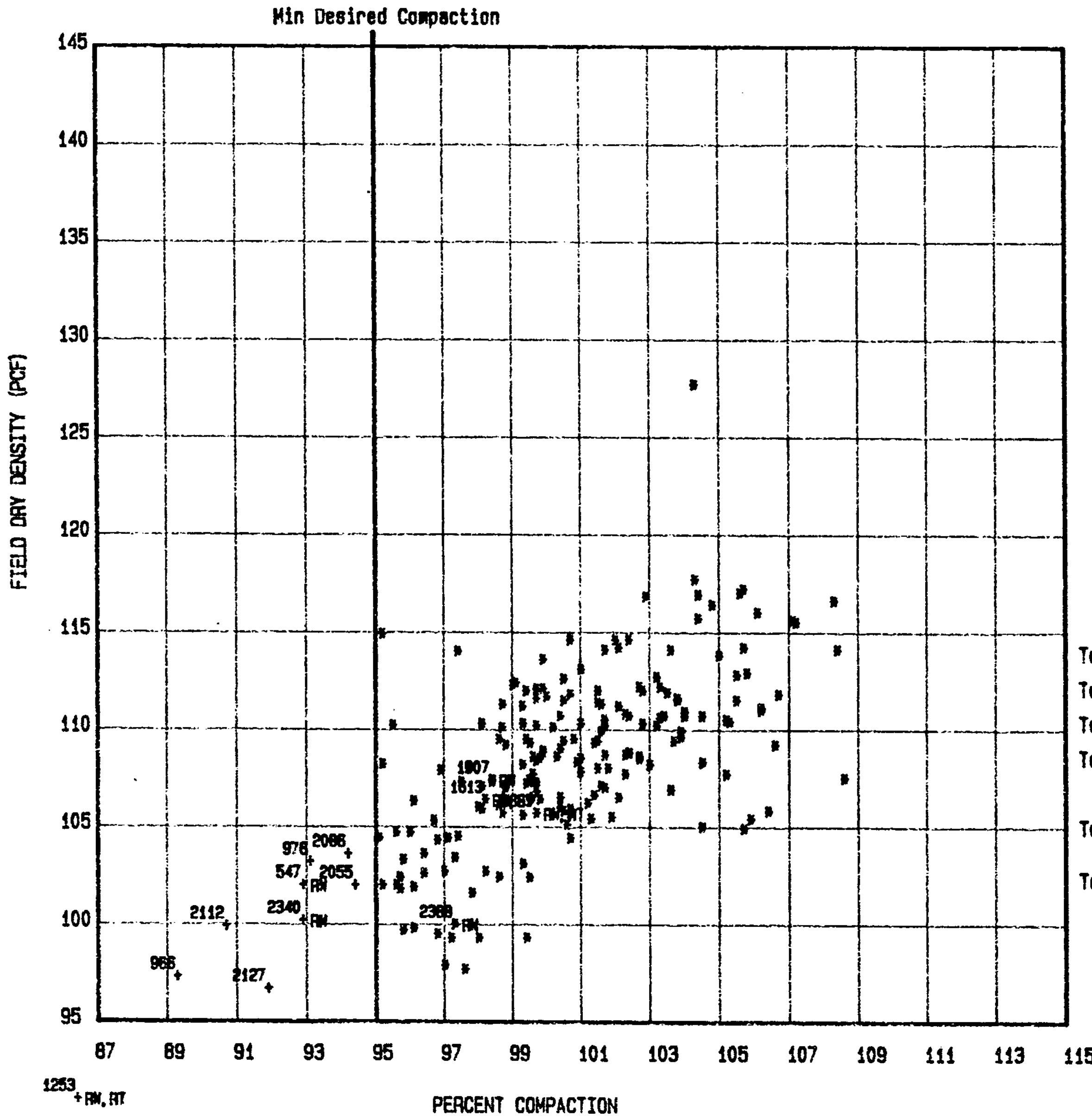
LEGEND

- * - Test within Specifications
- \+ - Test is out of Specification
- RW - Test Location Reworked - No Retest
- RW,RT - Test Location Reworked and Retested
- RM - Test Location Removed

	All Tests to Date	Tests this Report
Total Number of Tests Locs.	190	190
Test Locations Reworked Only	3	3
Test Loc. Reworked and Retested	3	3
Test Locations Removed	1	1

Tests Outside Specifications in Permanent Fill

Total Out of Spec.	48	48
Total Out on M.C.	42	42
Total Out on % Comp.	2	2
Total Out on M.C. and % Comp.	4	4

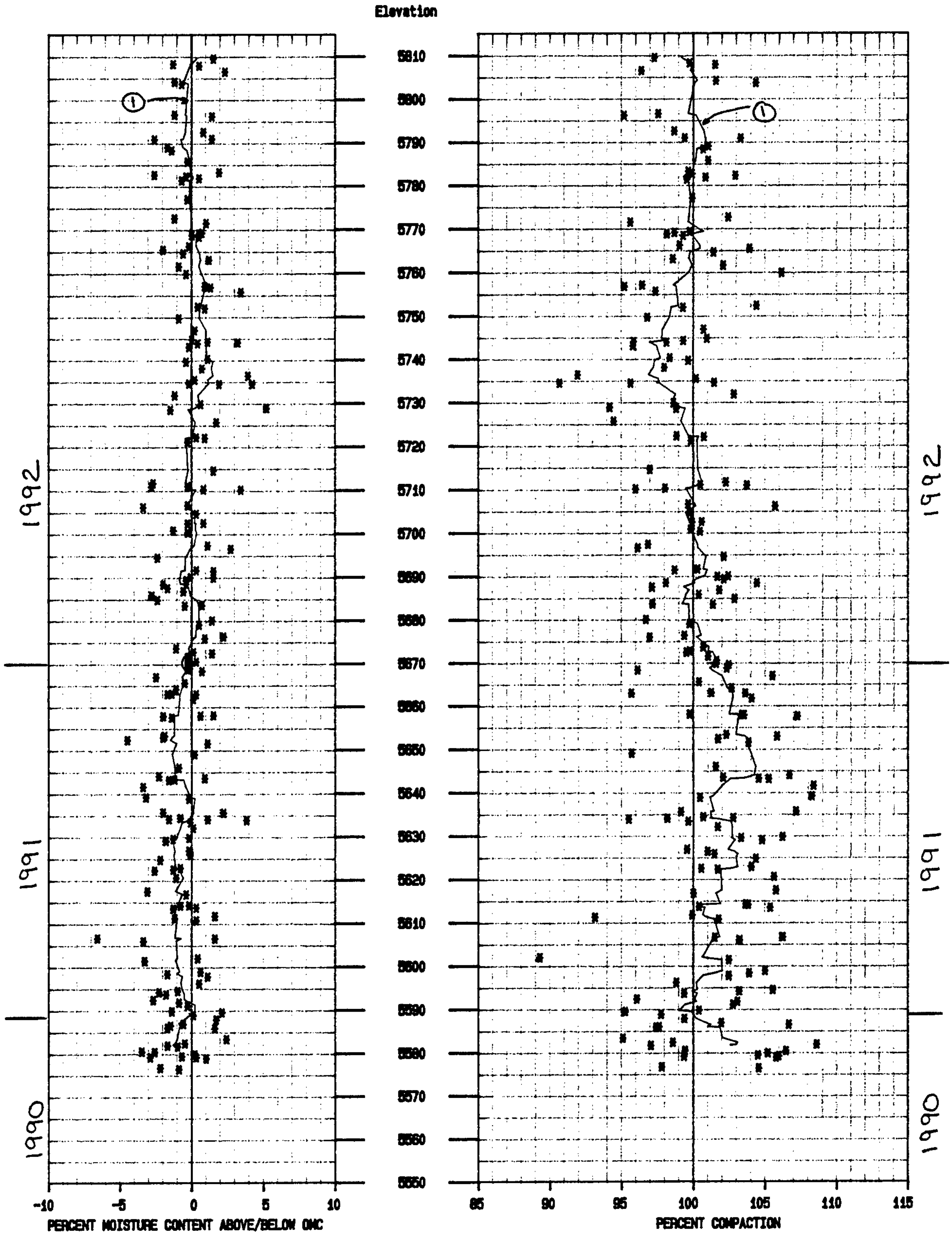


PROJECT: LITTLE DELL LAKE, DAM AND APP.
DISTRICT: CESPK
DATE OF REPORT : 12-08-1992
REPORT PERIOD : 01-01-90 thru 12-31-92
REPORT NUMBER : IC.5
TYPE OF MATERIAL: IMPERVIOUS

LEGEND

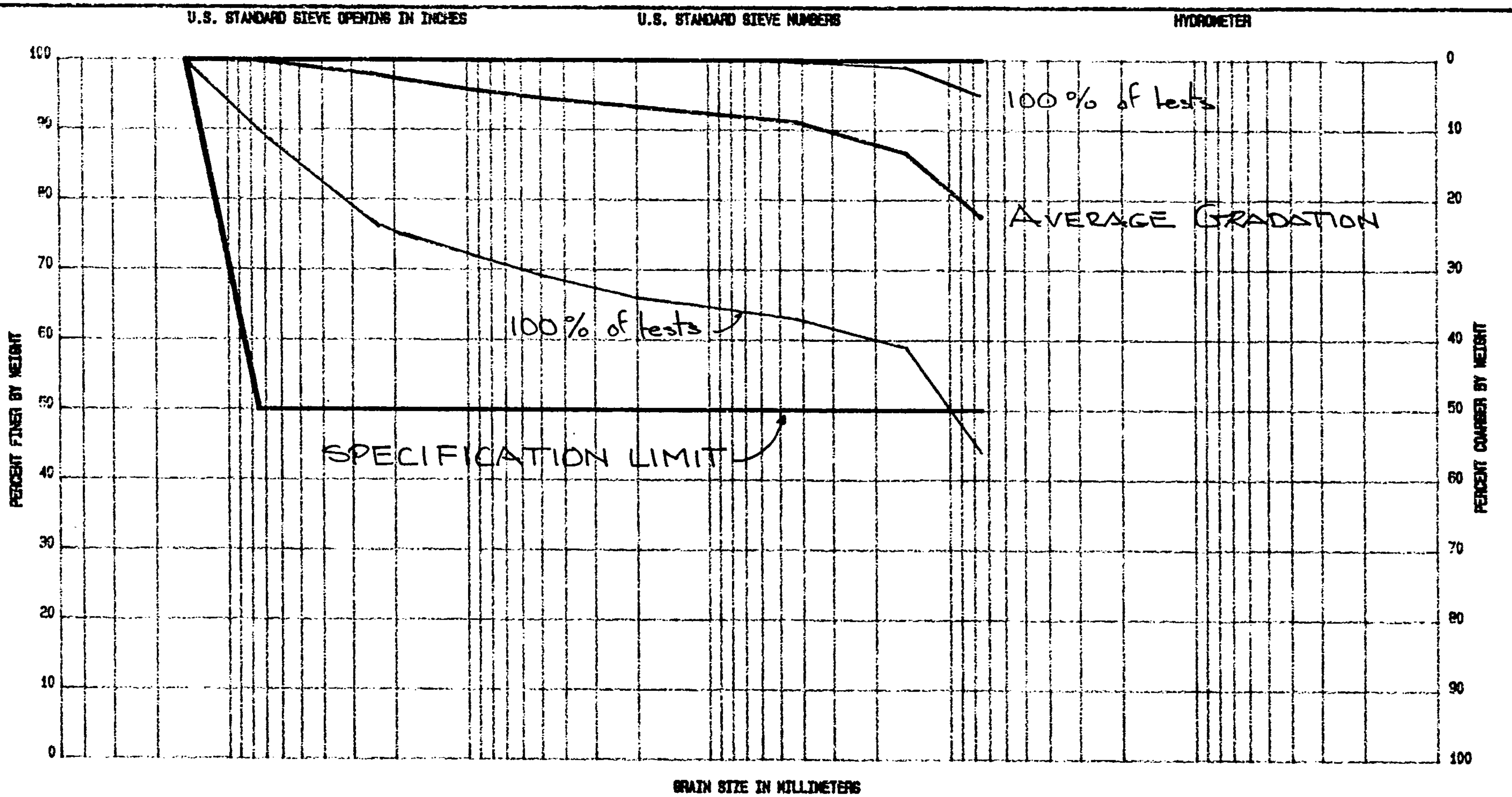
* - Test within Desired Limits
\+ - Test is out of Desired Limits
RW - Test Location Reworked - No Retest
RW, RT - Test Location Reworked and Retested
RM - Test Location Removed

	All Tests to Date	Tests this Report
Total Number of Tests Locs.	190	190
Test Locations Reworked Only	3	3
Test Loc. Reworked and Retested	3	3
Test Locations Removed	1	1
Tests Below Desired Compaction Limits in Fill		
Total Out of % Comp.	6	6



① Curve represents a running average of 10 tests

IMPERVIOUS



Represents all test data From 1990, 1991, 1992

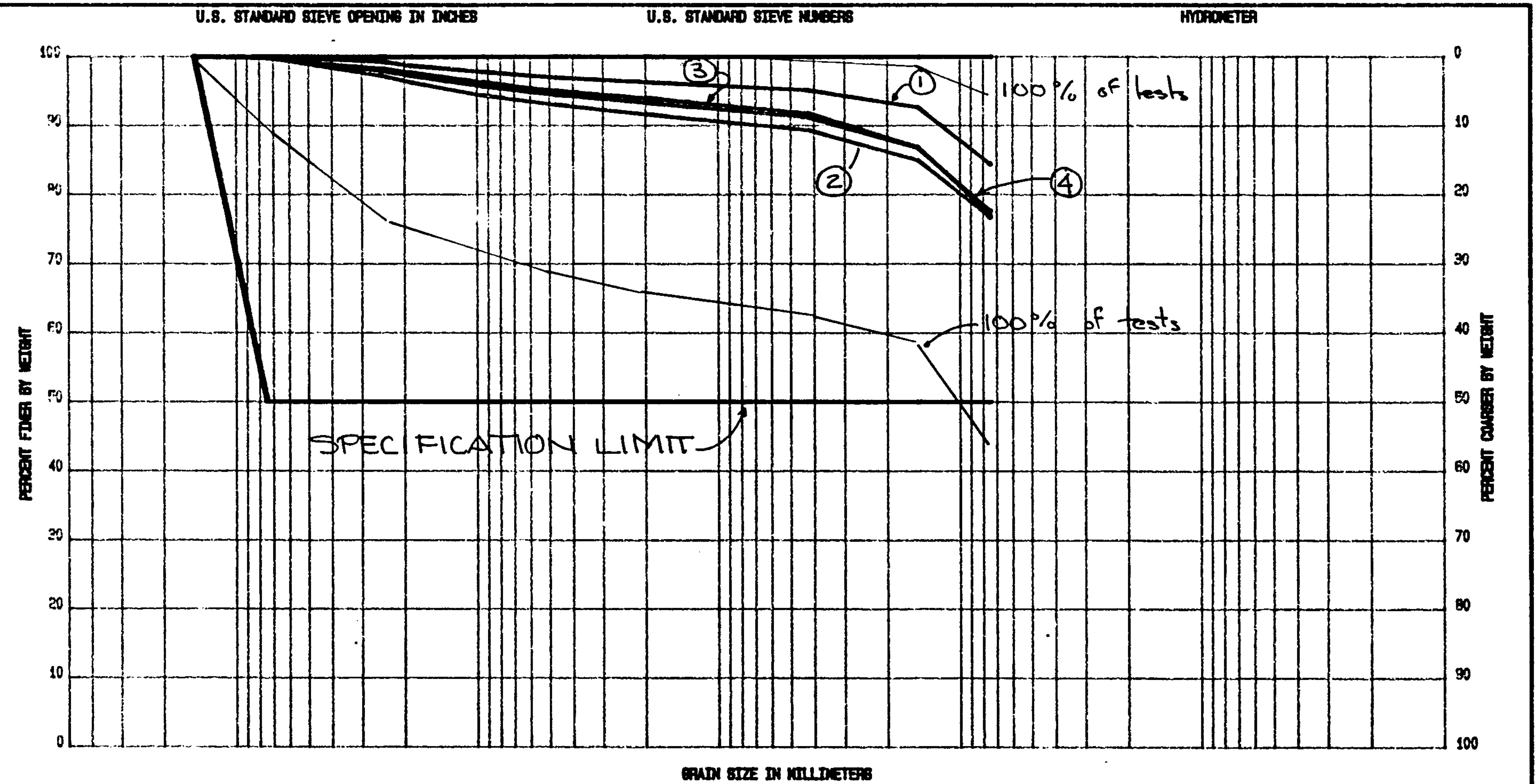
Project LITTLE DELL DAM

Area IMPERVIOUS

Boring No.

Date

GRADATION CURVES



1 1990
2 1991
3 1992
4 1990. 1991. 1992

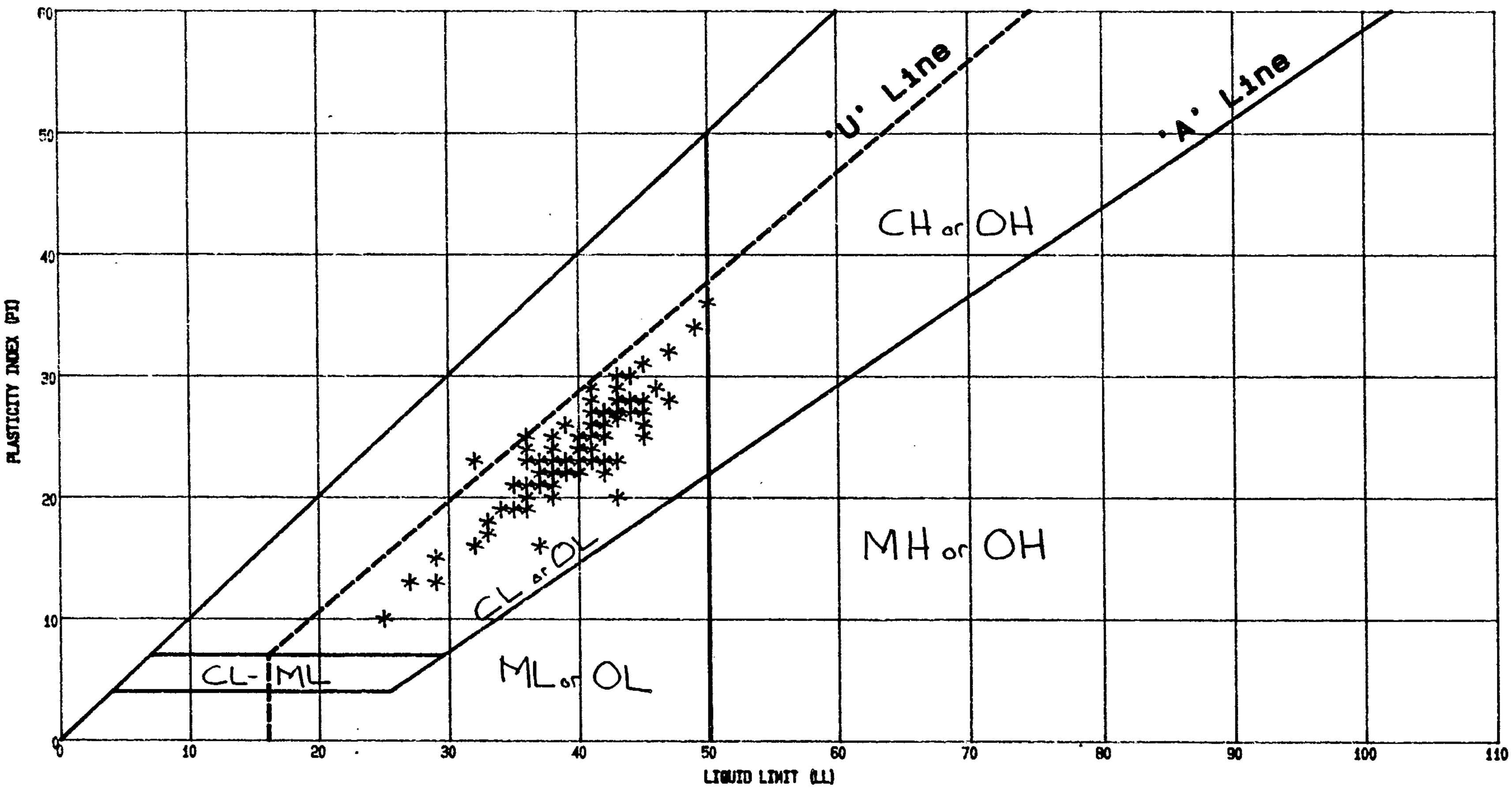
AVERAGE GRADATION CURVES BY YEAR

Project LITTLE DELL DAM

Area IMPERVIOUS

Boring No.

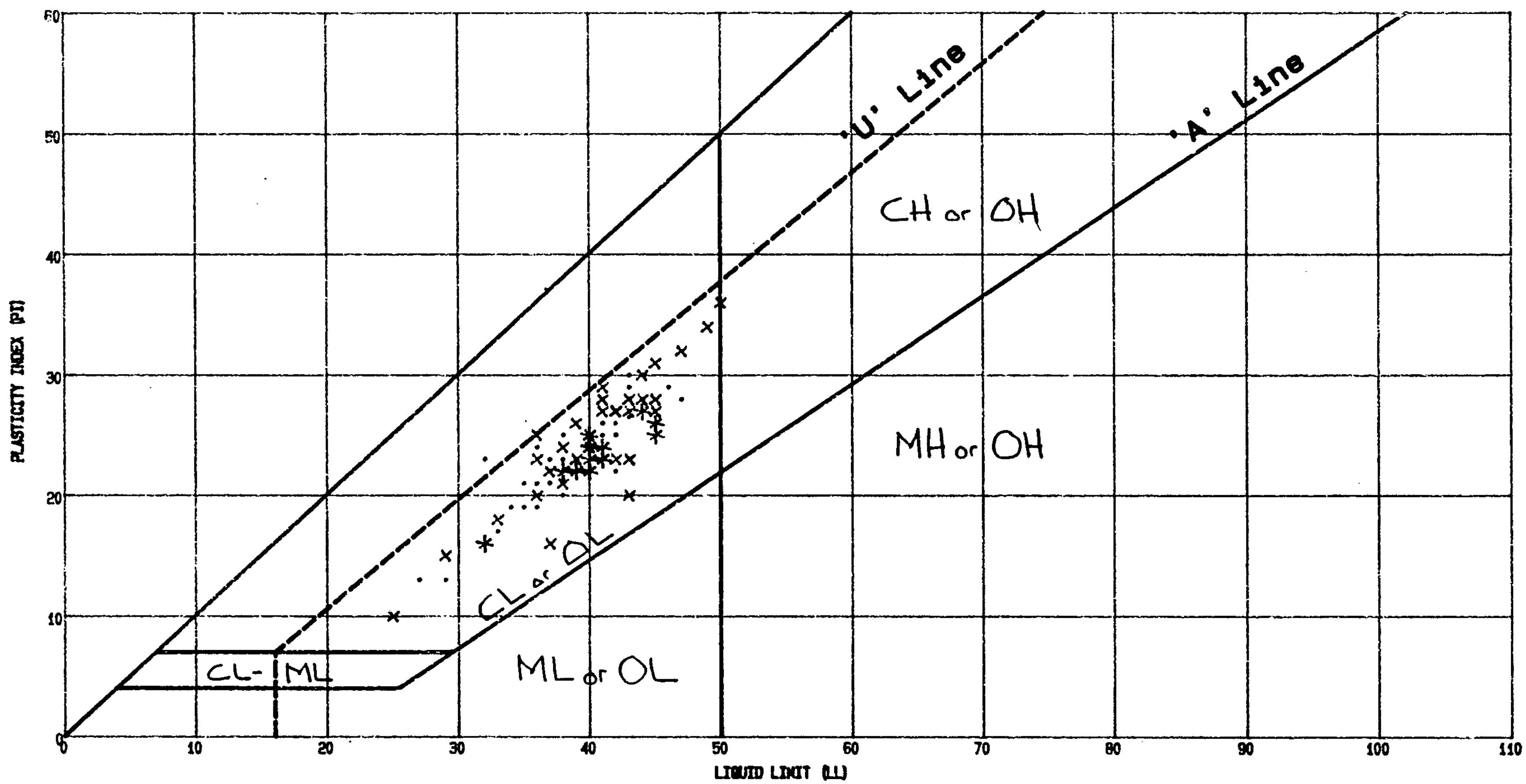
Date



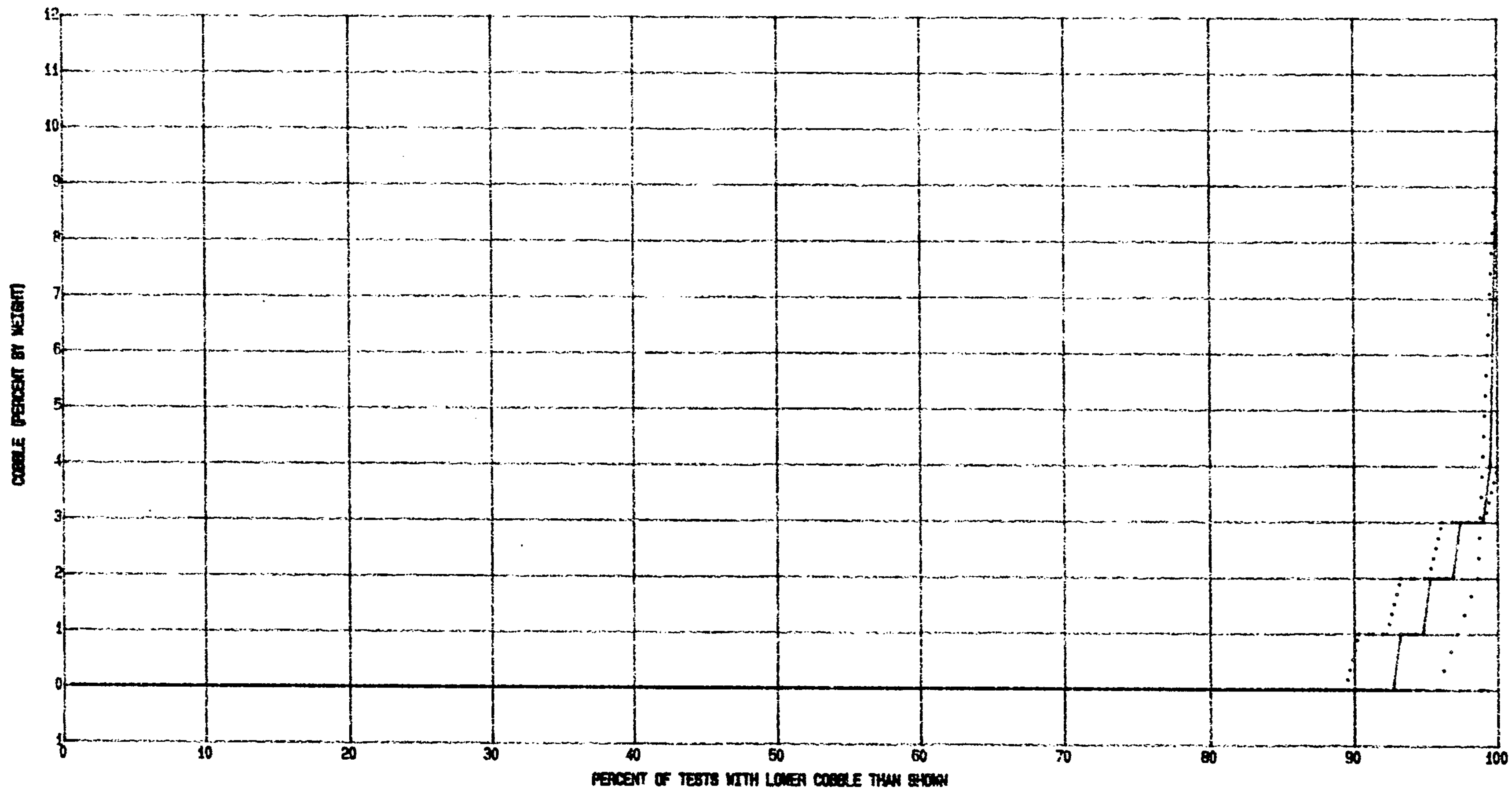
Represents all test data for 1990, 1991, 1992

Project	LITTLE DELL DAM
Area	IMPERVIOUS
Boring No.	
Date	

PLASTICITY CHART



* 1990	Project LITTLE DELL DAM
• 1991	Area IMPERVIOUS
× 1992	Boring No.
PLASTICITY CHART	Date



Line Style	From Date	To Date	# Points	Mean	Std Dev	10 %	Median	90 %
....	01-01-92	12-31-92	103	.2427184	.772899	0	0	0
. . . . . .	01-01-91	12-31-91	70	.1857143	1.219323	0	0	0
— — — — —	01-01-90	12-31-90	18	0	0	0	0	0
————	01-01-90	12-31-92	191	.1989529	.9303078	0	0	0

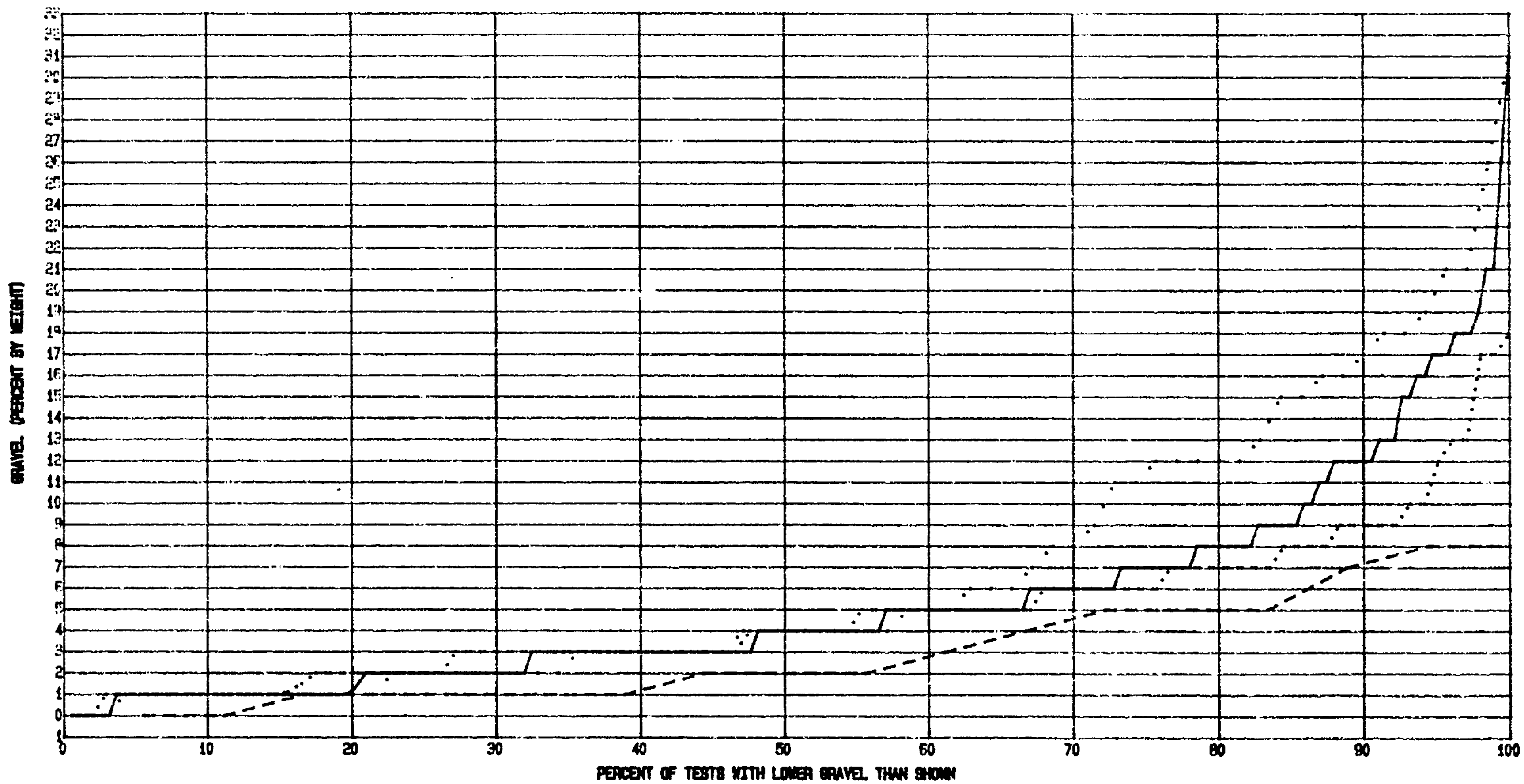
COBBLE - S-CURVE

Project LITTLE DELL DAM

Area IMPERVIOUS

Boring No.

Date



Line Style	From Date	To Date	# Points	Mean	Std Dev	10 %	Median	90 %
....	01-01-92	12-31-92	103	4.782524	3.574952	1	4	9
. . . . . .	01-01-91	12-31-91	70	6.857143	6.924616	1	4	16
– – – – –	01-01-90	12-31-90	18	3.111111	2.654363	0	2	7
———	01-01-90	12-31-92	191	5.36534	5.137119	1	4	12

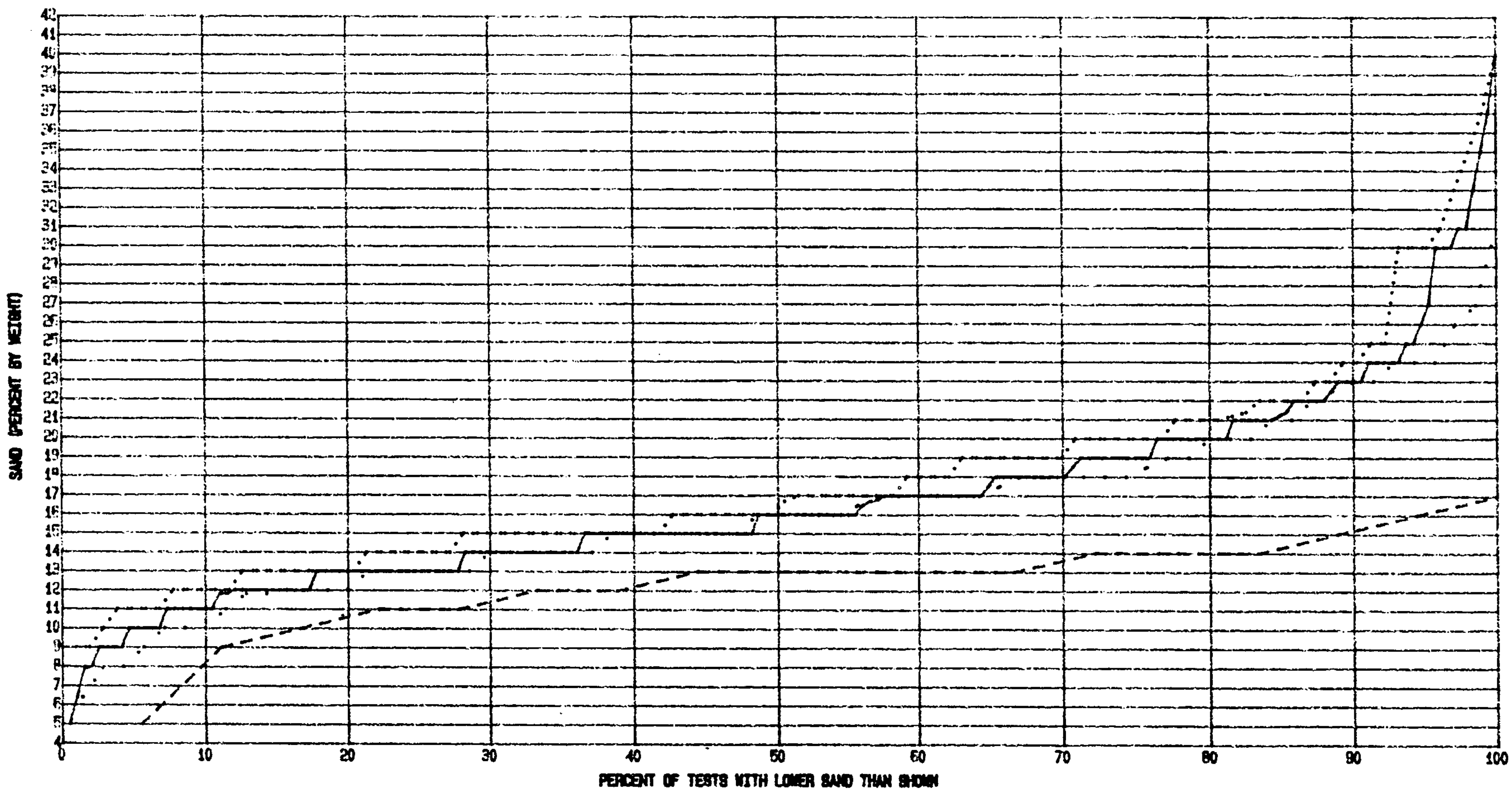
Project LITTLE DELL DAM

Area IMPERVIOUS

Boring No.

Date

GRAVEL - S-CURVE



Line Style	From Date	To Date	# Points	Mean	Std Dev	10 %	Median	90 %
....	01-01-92	12-31-92	103	17.8767	5.817423	12	16	24
. . . . . .	01-01-91	12-31-91	70	16.28143	4.74135	10	16	22.5
– – – – – –	01-01-90	12-31-90	18	12.5	2.727862	8	13	15
————	01-01-90	12-31-92	191	16.78634	5.429253	11	16	23

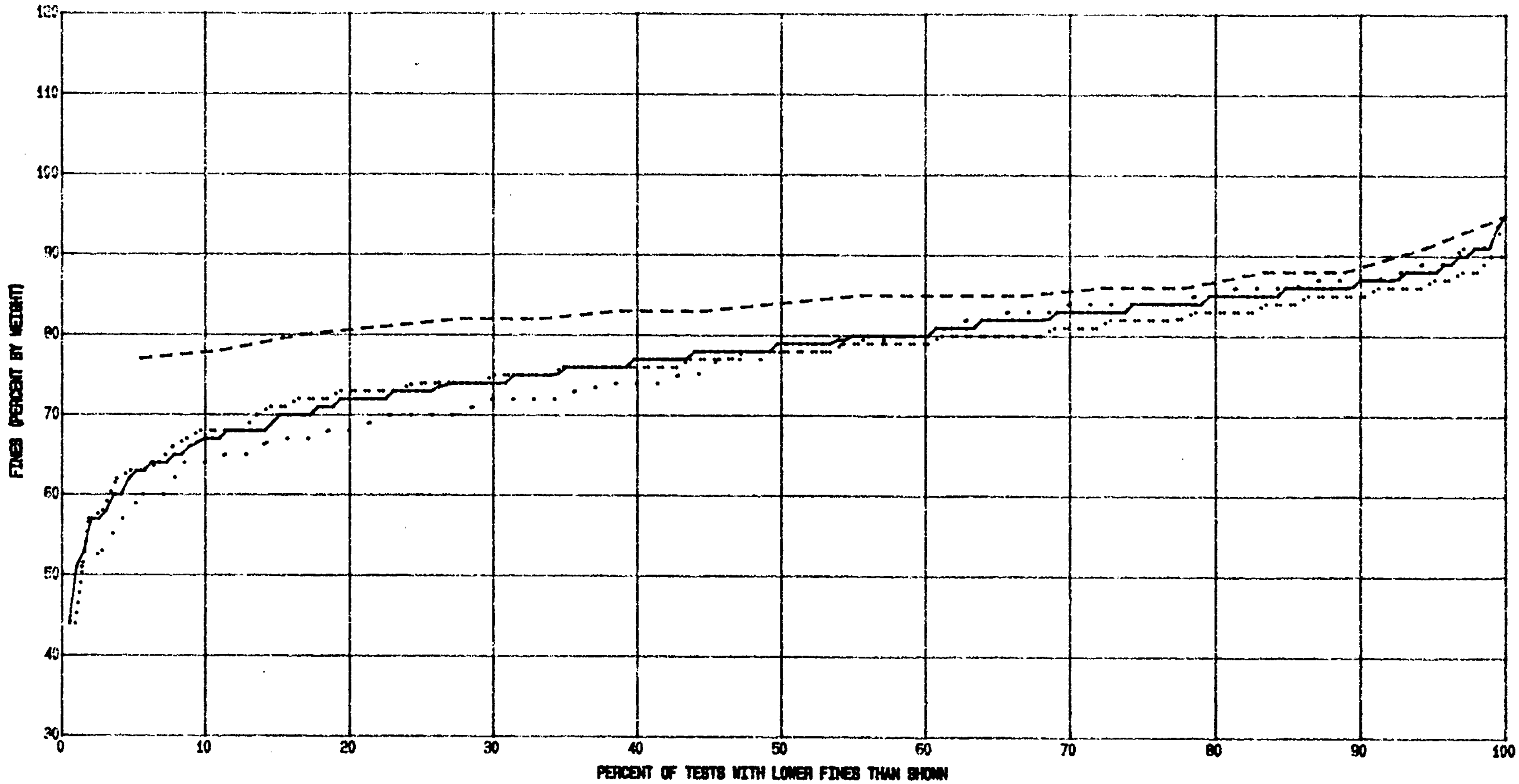
SAND - S-CURVE

Project LITTLE DELL DAM

Area IMPERVIOUS

Boring No.

Date



Line Style	From Date	To Date	# Points	Mean	Std Dev	10 %	Median	90 %
....	01-01-92	12-31-92	103	77.09806	7.418979	68	78	86
. . . . . .	01-01-91	12-31-91	70	76.67573	9.497406	64	77	87
– – – – –	01-01-90	12-31-90	18	84.38889	4.407732	77	83	88
———	01-01-90	12-31-92	191	77.63036	8.298334	67	79	86.2

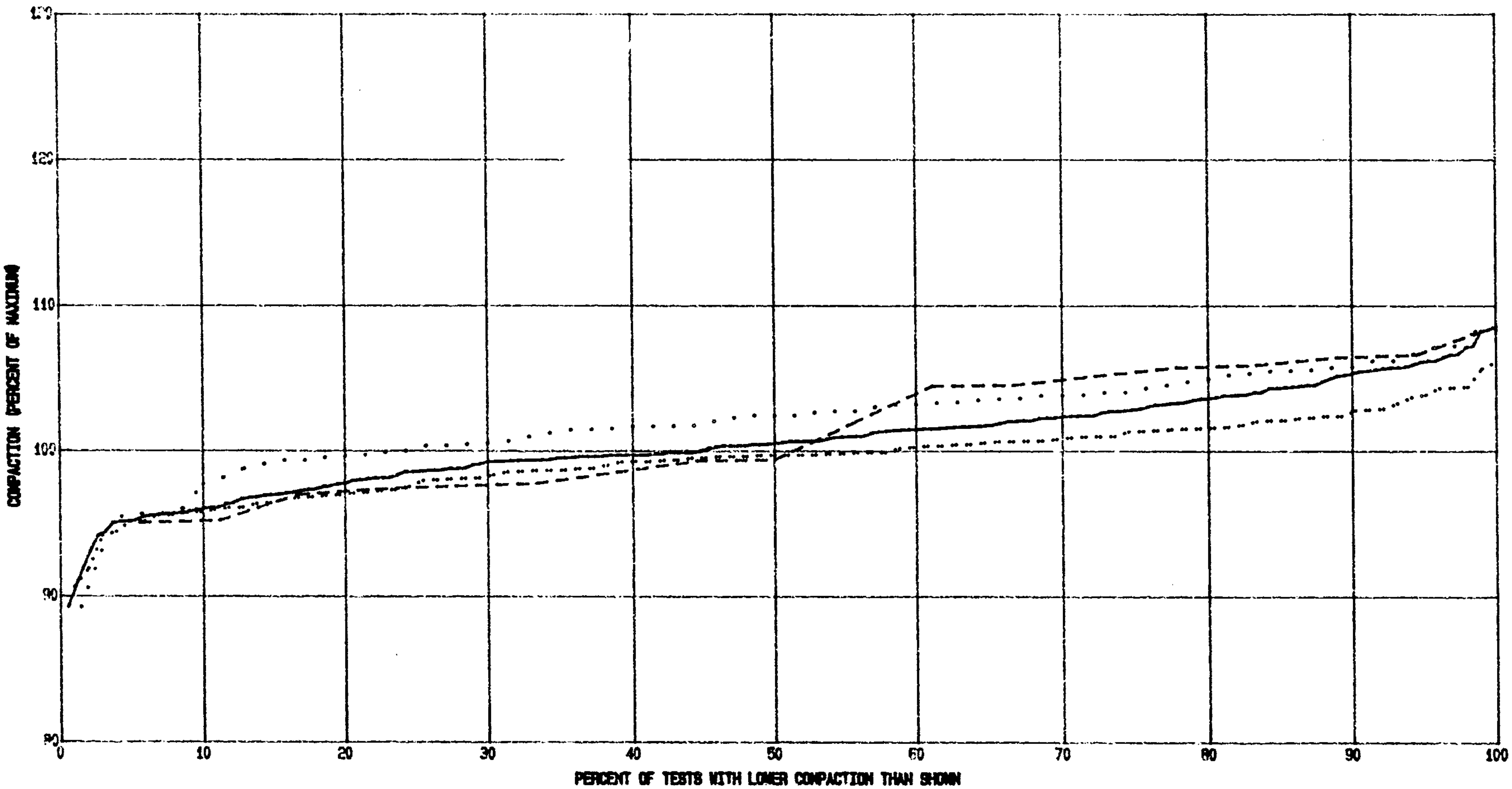
FINES - S-CURVE

Project LITTLE DELL DAM

Area IMPERVIOUS

Boring No.

Date



Line Style	From Date	To Date	# Points	Mean	Std Dev	10 %	Median	90 %
....	01-01-92	12-31-92	102	99.52219	2.755133	95.8256	99.71969	102.4129
. . . . . .	01-01-91	12-31-91	70	102.0905	3.499755	97.73756	102.4482	105.7407
– – – – –	01-01-90	12-31-90	18	101.4928	4.436296	95.08197	99.32562	106.4366
———	01-01-90	12-31-92	190	100.6551	3.437719	95.967	100.4748	105.2381

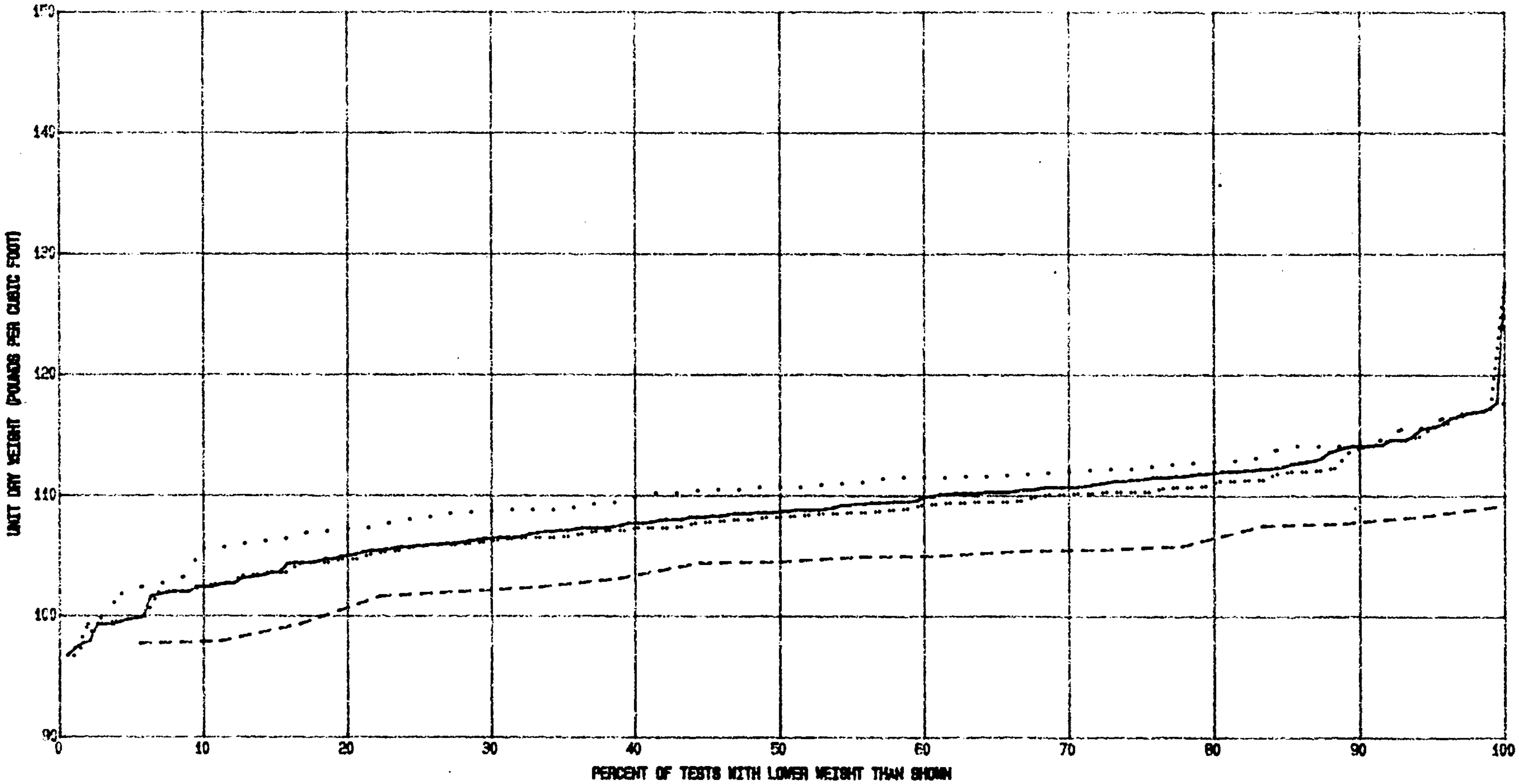
IN PLACE COMPACTION - S-CURVE

Project LITTLE DELL DAM

Area IMPERVIOUS

Boring No.

Date



Line Style	From Date	To Date	# Points	Mean	Std Dev	10 %	Median	90 %
....	01-01-92	12-31-92	102	108.197	4.561852	102.4	108.2	113.6
. . . . . .	01-01-91	12-31-91	70	110.1329	3.954047	105.8	110.7	114.1
– – – – –	01-01-90	12-31-90	18	104.0111	3.37166	97.7	104.4	107.7
———	01-01-90	12-31-92	190	108.5136	4.562251	102.4	108.6	114.1

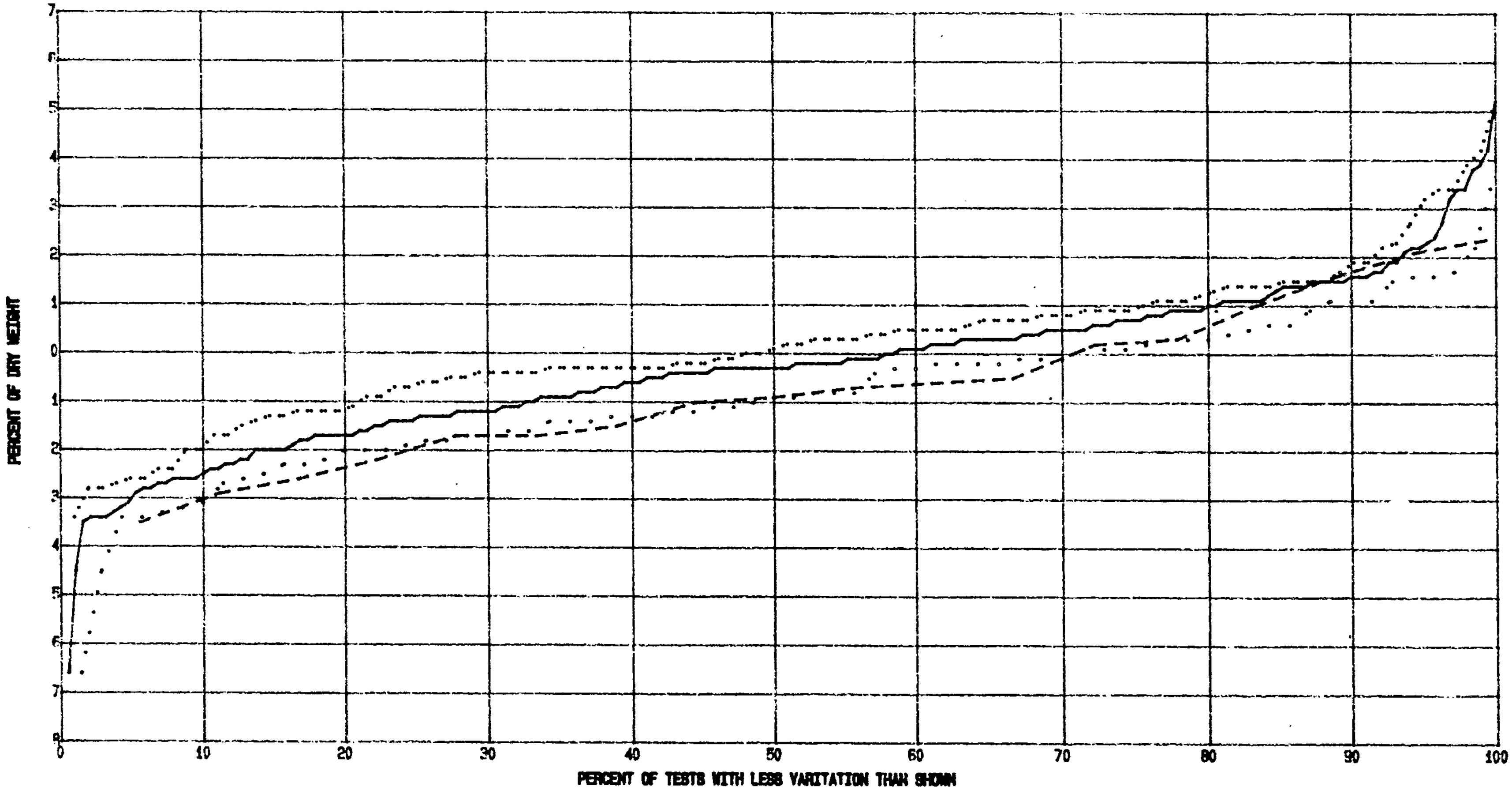
IN PLACE UNIT WEIGHT - S-CURVE

Project LITTLE DELL DAM

Area IMPERVIOUS

Boring No.

Date



Line Style	From Date	To Date	# Points	Mean	Std Dev	10 %	Median	90 %
....	01-01-92	12-31-92	102	.1705882	1.558724	-2	0	1.7
. . . . . .	01-01-91	12-31-91	70	-.8585716	1.686158	-3.1	-1	1.1
- - - - - -	01-01-90	12-31-90	18	-.6777777	1.694127	-3.5	-1	1.6
______	01-01-90	12-31-92	190	-.2889473	1.678855	-2.6	-.3	1.5

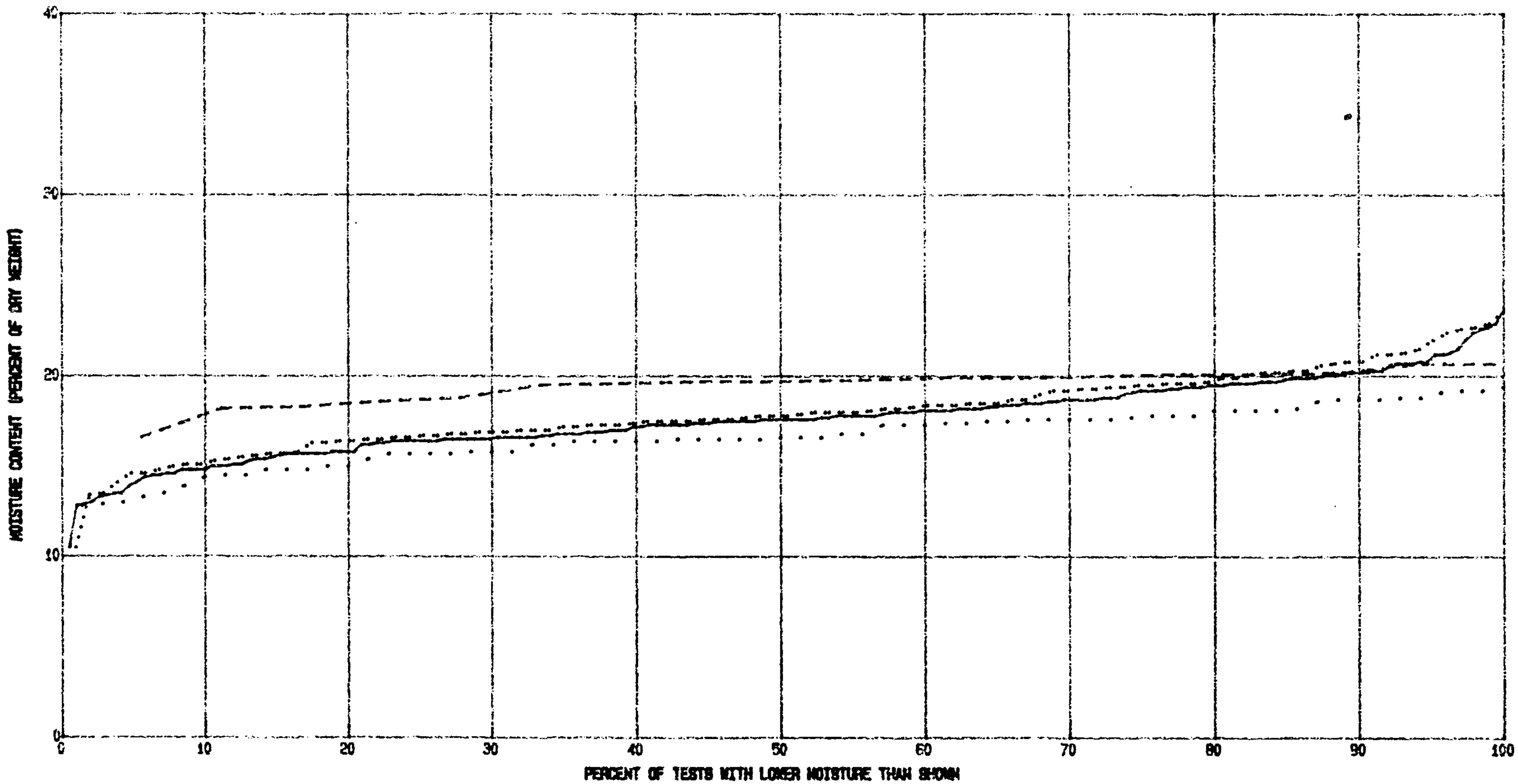
OMC COMPARISON - S-CURVE

Project LITTLE DELL DAM

Area IMPERVIOUS

Boring No.

Date



Line Style	From Date	To Date	# Points	Mean	Std Dev	10 %	Median	90 %
....	01-01-92	12-31-92	103	18.01844	2.254367	15.1	17.8	20.8
. . . . . .	01-01-91	12-31-91	70	16.62428	1.639992	14.4	16.5	18.7
— — — —	01-01-90	12-31-90	18	19.46667	1.018236	18.8	19.7	20.2
————	01-01-90	12-31-92	191	17.64388	2.138163	14.8	17.6	20.2

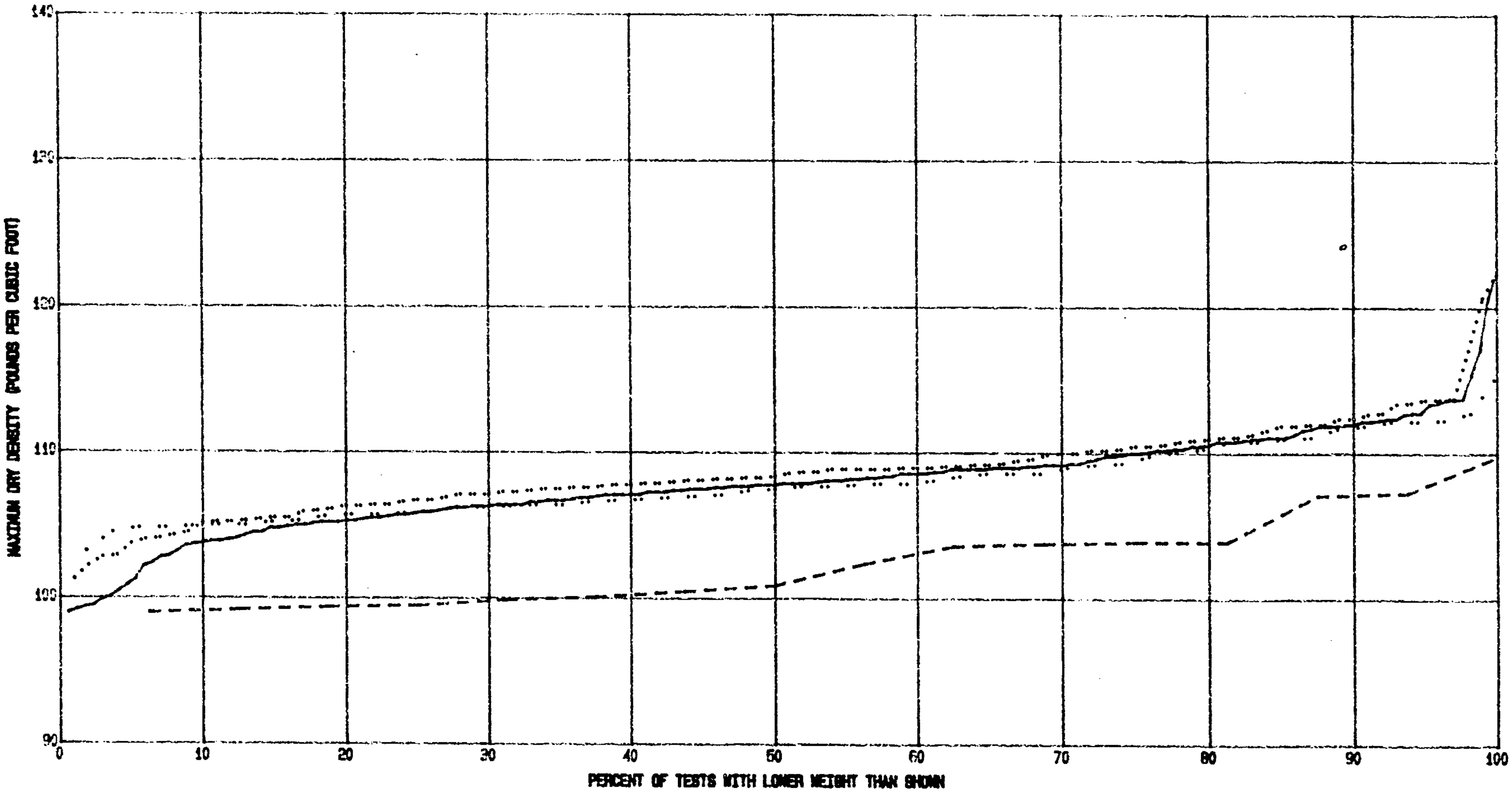
MOISTURE CONTENT - S-CURVE

Project LITTLE DELL DAM

Area IMPERVIOUS

Boring No.

Date



Line Style	From Date	To Date	# Points	Mean	Std Dev	10 %	Median	90 %
....	01-01-92	12-31-92	100	108.744	3.373731	105.1	108.4	112.4
. . . . . .	01-01-91	12-31-91	54	107.9648	2.608578	104.9	107.4	111.7
— — — —	01-01-90	12-31-90	16	102.5188	3.317786	99	100.9	107.1
———	01-01-90	12-31-92	170	107.9106	3.598644	103.7	107.8	112

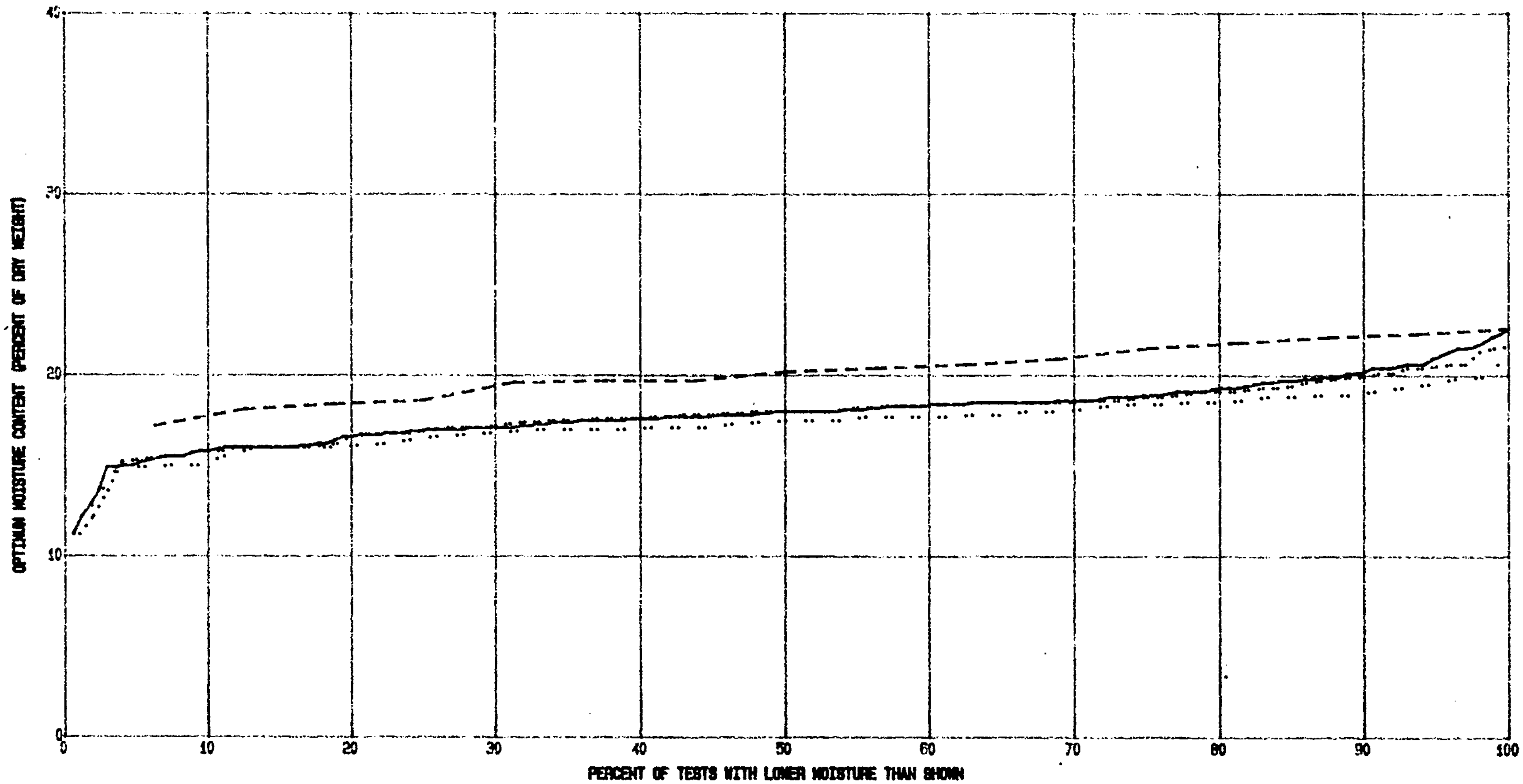
LABORATORY MAX. DRY DENSITY – S-CURVE

Project LITTLE DELL DAM

Area IMPERVIOUS

Boring No.

Date



Line Style	From Date	To Date	# Points	Mean	Std Dev	10 %	Median	90 %
....	01-01-92	12-31-92	100	17.861	1.752062	15.8	18	19.9
. . . . . .	01-01-91	12-31-91	54	17.39815	1.487878	15	17.4	18.9
— — — —	01-01-90	12-31-90	16	20.23125	1.607804	17.2	20.2	22.1
————	01-01-90	12-31-92	170	17.93706	1.821072	15.8	18	20.1

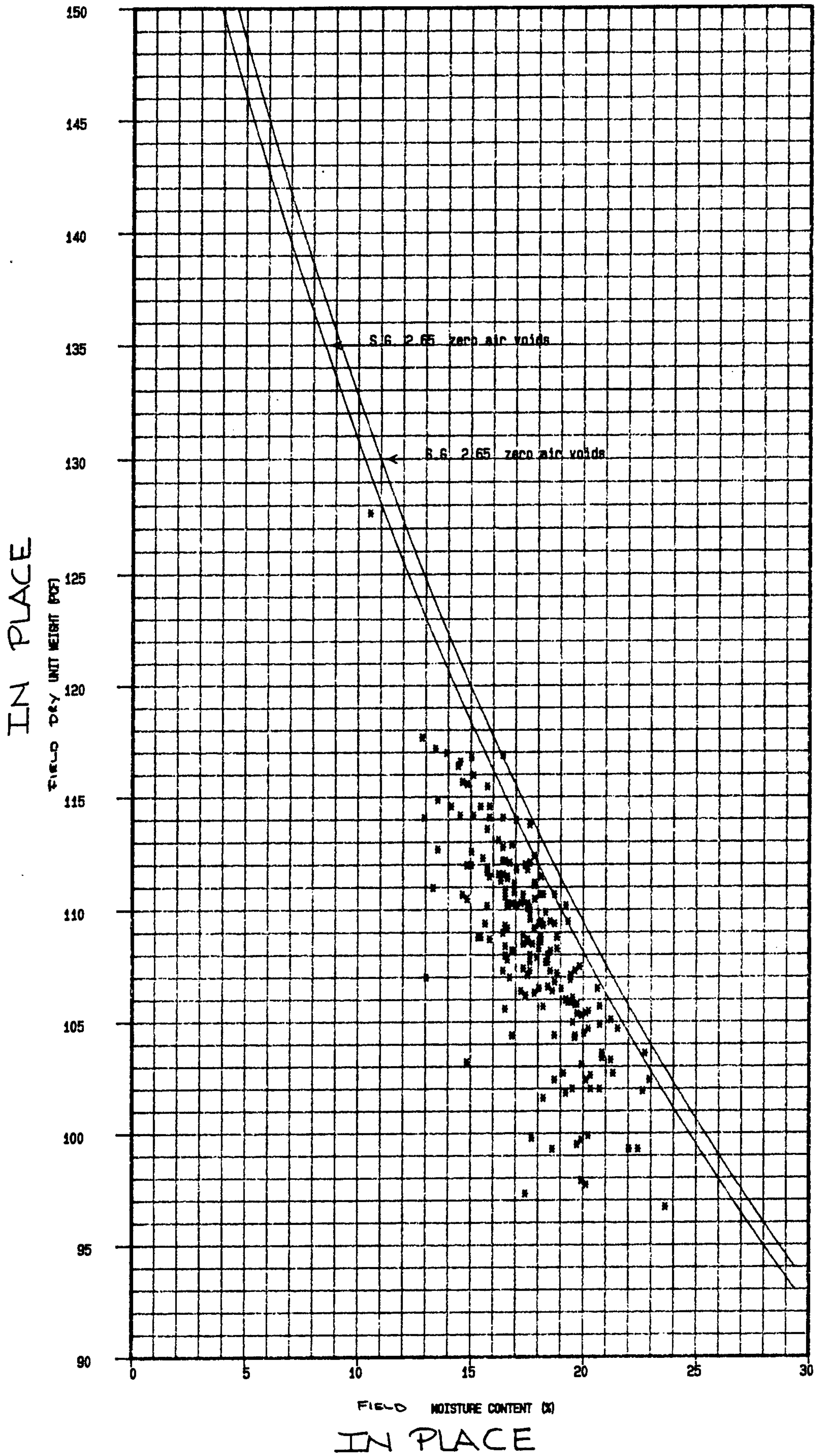
LABORATORY OPTIMUM MOISTURE CONTENT - S-CURVE

Project LITTLE DELL DAM

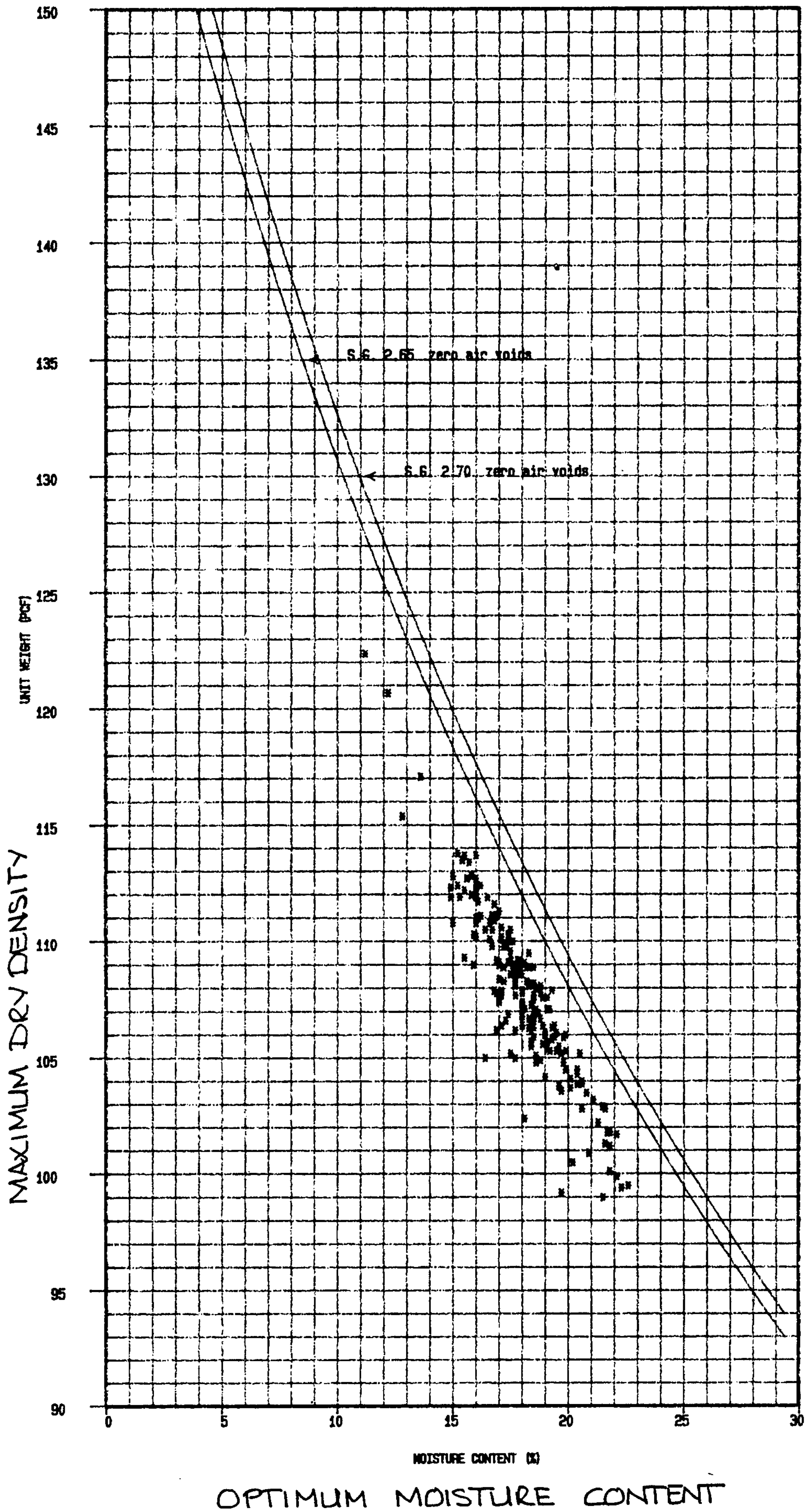
Area IMPERVIOUS

Boring No.

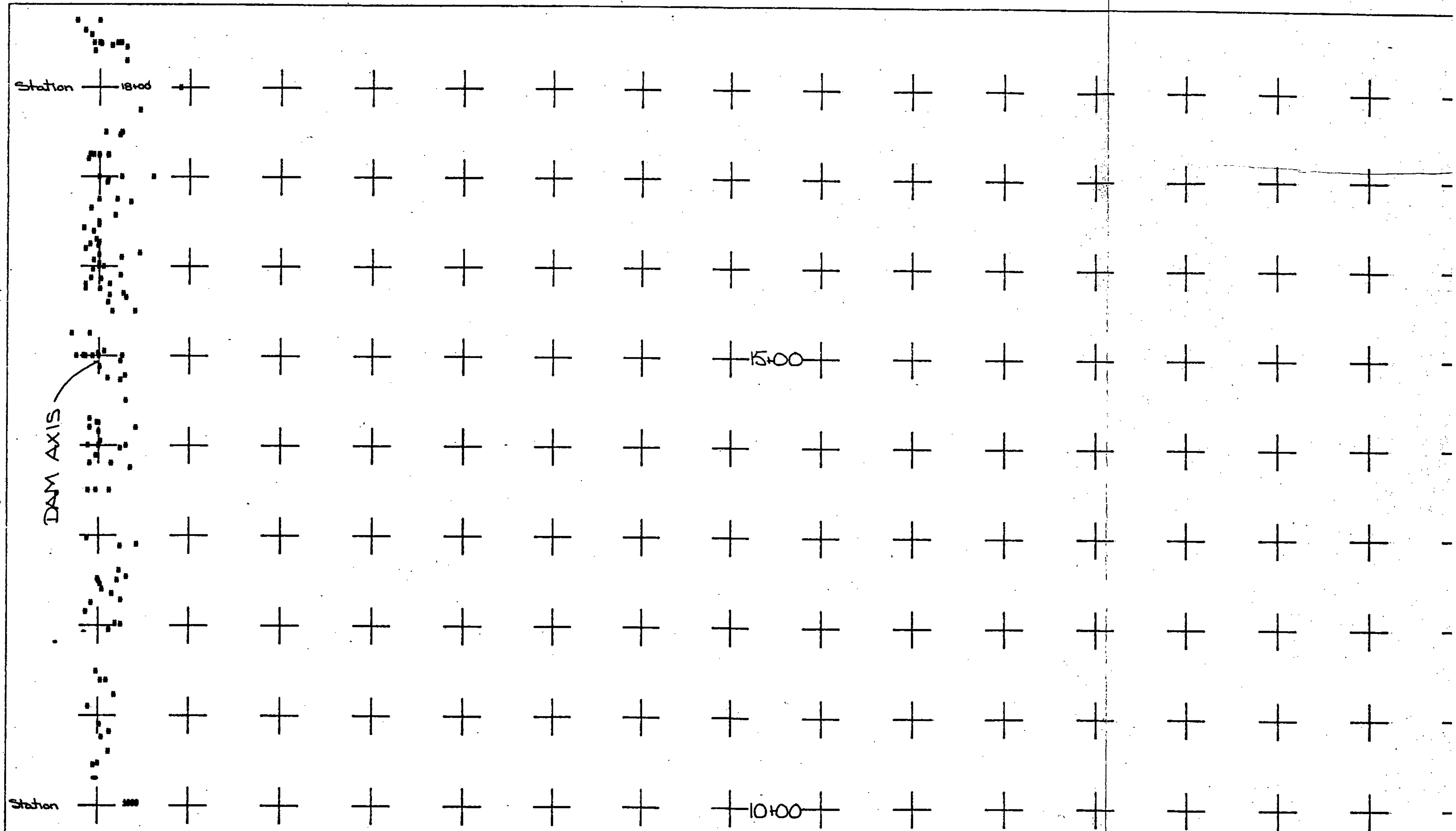
Date


IN PLACE
FIELD DRY UNIT WEIGHT (PCF)
150
145
140
135
130
125
120
115
110
105
100
95
90
0
5
10
15
20
25
30
S.G. 2.65 zero air voids
S.G. 2.65 zero air voids
FIELD MOISTURE CONTENT (%)
IN PLACE

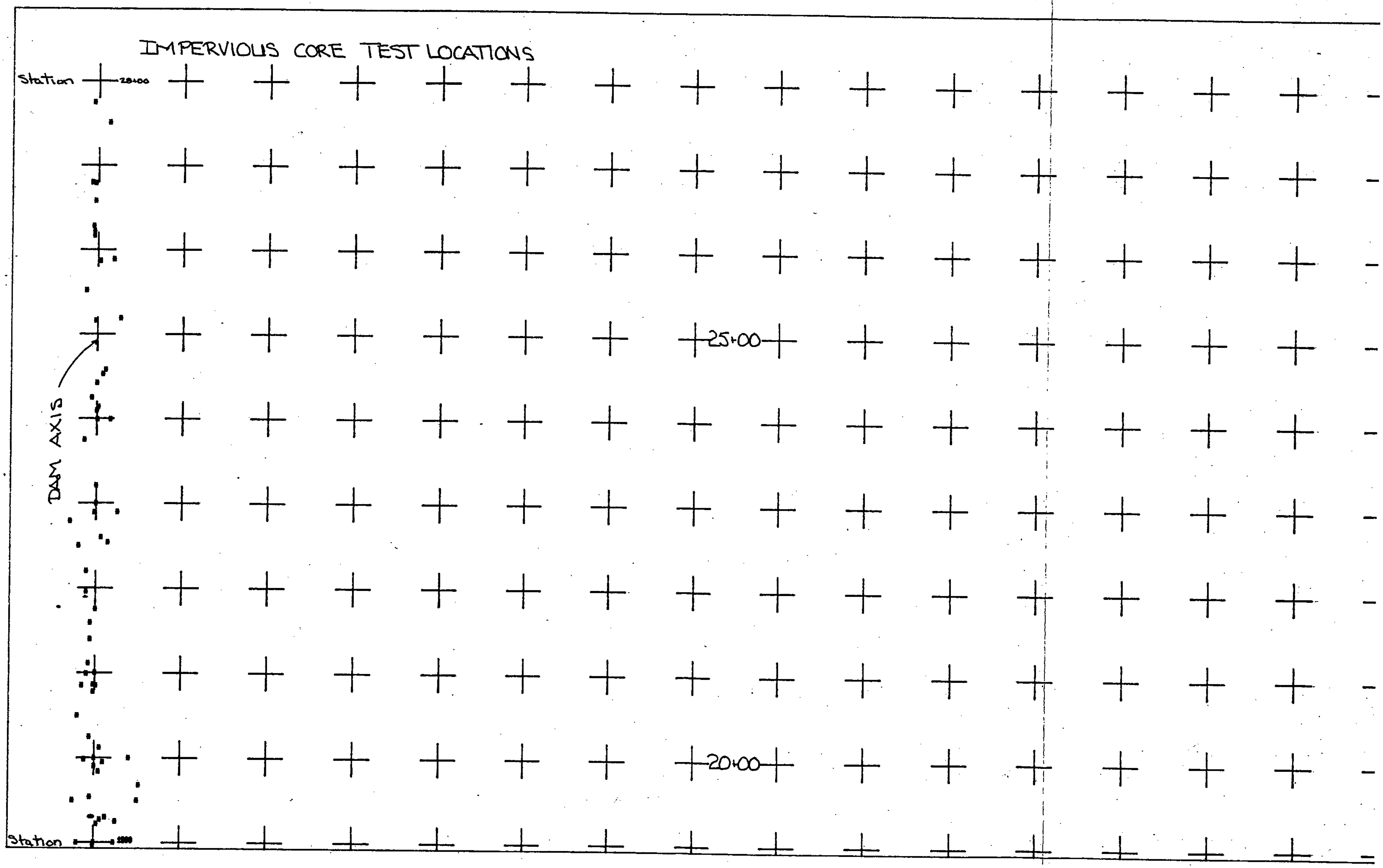
IMPERVIOUS


S.G. 2.65 zero air voids
S.G. 2.70 zero air voids
UNIT WEIGHT (PCF)
MAXIMUM DRY DENSITY
MOISTURE CONTENT (%)
OPTIMUM MOISTURE CONTENT

IMPERVIOUS



IMPERVIOUS CORE TEST LOCATIONS



IMPERVIOUS CORE TEST LOCATIONS
Station
28+00
25+00
20+00
DAM AXIS
Station

APPENDIX II

FIELD CONTROL DATA, LITTLE DELL DAM

TRANSITION FILL I
DOWNSTREAM SHELL

Specifications Comparison Report

Gradations Report

Compaction Report

Comments Report

Gradation Curves

S Curves
- % Gravel
- % Sand
- % Fines
- % Relative Density
- Unit Weight
- Moisture Content

Test Locals

PROJECT: LITTLE DELL LAKE, DAM AND APPURTENANCES RIVER: SALT LAKE CITY STREAMS STATE: UTAH TOWN: SALT LAKE CITY	CONTRACT NO. DACW05-89-C-0045 CONTRACTOR: CLEMENT BROTHERS AND J.E. STARNES CO.	DATE OF REPORT: 12-10-92 01-01-90 THRU 12-31-92

EMBANKMENT ZONE	MIN. RELATIVE DENS.	SPEC. W.C. % RANGE	LOOSE LIFT THICK. (IN)	NUMBER OF PASSES	COMPACTION EQUIPMENT
TRANSITION I	50		12	2	IR SD150D

TEST NUMBER	DATE	ELEV	LOCATION STATION	LOCATION OFFSET	% COBBL	% GRAV	% SAND	% FINES	% COMPACTION DESIGN >= 50%	MOISTURE IN SPEC %- %	GRADATION IN SPEC	GRAVELS IN SPEC > %	FINES IN SPEC < 5 %	TEST IN SPEC	STATUS FAILED TESTS
497	09-29-90	5580.0	1522	-57	0.0	6.0	90.0	4.0	Y		Y	-	Y	Y	
504	10-03-90	5579.0	1500	-100	0.0	0.0	97.0	3.0	Y	-	Y	-	Y	Y	
507	10-04-90	5580.4	1485	-85	0.0	1.0	95.0	4.0	Y	-	Y	-	Y	Y	
515	10-05-90	5579.8	1450	-140	0.0	1.0	95.0	4.0	Y	-	Y	-	Y	Y	
526	10-11-90	5579.5	1596	-100	0.0	7.0	89.0	4.0	Y	-	Y	-	Y	Y	
563	10-24-90	5580.0	1540	-125	0.0	3.0	93.0	4.0	N	-	Y	-	Y	N	OLD
661	05-17-91	5577.4	1590	-225	0.0	10.0	85.5	4.5	Y	-	Y	-	Y	Y	
655	05-16-91	5578.4	1600	-180	0.0	4.0	92.0	4.0	Y	-	Y	-	Y	Y	RW,RT
673	05-20-91	5579.3	1730	-440	0.0	11.0	86.1	2.9	Y	-	Y	-	Y	Y	
675	05-20-91	5579.6	1682	-480	0.0	8.0	88.6	3.4	Y	-	Y	-	Y	Y	
681	05-22-91	5581.1	1715	-335	0.0	7.0	87.8	***5.2***	Y	-	N	-	N	N	
688	05-24-91	5571.0	1533	-310	0.0	3.0	92.0	5.0	Y	-	Y	-	Y	Y	
708	06-04-91	5579.0	1410	-281	0.0	4.0	90.3	***5.7***	Y	-	N	-	N	N	
715	06-05-91	5574.0	1407	-340	0.0	3.0	90.8	***6.2***	-	-	N	-	N	N	
717	06-05-91	5573.0	1408	-365	0.0	5.0	88.8	***6.2***	Y	-	N	-	N	N	
726	06-06-91	5568.5	1430	-460	0.0	6.0	88.6	***5.4***	-	-	N	-	N	N	
731	06-07-91	5577.2	1440	-575	0.0	4.0	89.9	***6.1***	N	-	N	-	N	N	OLD
742	06-10-91	5561.0	1456	-652	0.0	3.0	91.7	***5.3***	Y	-	N	-	N	N	
743	06-10-91	5561.4	1436	-720	0.0	3.0	90.9	***6.1***	Y	-	N	-	N	N	
752	06-12-91	5565.9	1500	-670	0.0	0.0	96.0	4.0	Y	-	Y	-	Y	Y	
763	06-14-91	5579.7	1400	-370	0.0	4.0	91.6	4.4	Y	-	Y	-	Y	Y	
766	06-14-91	5571.3	1555	-575	0.0	0.0	95.3	4.7	N	-	Y	-	Y	N	OLD
776	06-17-91	5579.7	1600	-669	0.0	0.0	96.3	3.7	N	-	Y	-	Y	N	OLD
797	06-22-91	5588.2	1392	-295	0.0	0.0	95.6	4.4	N	-	Y	-	Y	N	OLD
803	06-24-91	5567.0	1365	-598	0.0	0.0	95.4	4.6	Y	-	Y	-	Y	Y	
809	06-25-91	5587.7	1700	-300	0.0	0.0	95.5	4.5	Y	-	Y	-	Y	Y	
821	06-26-91	5581.4	1640	-530	0.0	1.0	95.2	3.8	Y	-	Y	-	Y	Y	
971	07-26-91	5603.2	1345	-380	0.0	10.0	82.9	***7.1***	Y	-	N	-	N	N	RM
958A	07-29-91	5602.5	1365	-180	0.0	0.0	96.3	3.7	Y	-	Y	-	Y	Y	
989	07-31-91	5605.3	1370	-375	0.0	0.0	95.9	4.1	Y	-	Y	-	Y	Y	
1080	08-13-91	5615.5	1374	-530	0.0	7.0	88.2	4.8	Y	-	Y	-	Y	Y	
1131	08-20-91	5639.2	1800	-300	0.0	4.0	89.9	***6.1***	Y	-	N	-	N	N	
1135	08-21-91	5626.8	1965	-206	0.0	5.0	90.3	4.7	-	-	N	-	Y	N	
1143	08-22-91	5629.4	1308	-190	0.0	3.0	92.7	4.3	-	-	Y	-	Y	Y	
1191	08-24-91	5631.8	1990	-210	0.0	1.0	95.7	3.3	-	-	Y	-	Y	Y	
1248	08-31-91	5632.7	2000	-190	0.0	3.0	93.2	3.8	Y	-	Y	-	Y	Y	
1280	09-06-91	5643.0	1285	-250	0.0	1.0	95.6	3.4	Y	-	Y	-	Y	Y	
1308	09-17-91	5646.4	1945	-300	0.0	2.0	94.6	3.4	-	-	Y	-	Y	Y	
1323	09-20-91	5647.3	1991	-231	0.0	12.0	82.6	***5.4***	Y	-	N	-	N	N	RM
1332	09-22-91	5647.4	1991	-231	0.0	2.0	94.1	3.9	-	-	Y	-	Y	Y	
1351	09-25-91	5654.6	1280	-145	0.0	2.0	95.9	2.1	N	-	N	-	Y	N	OLD
1375	10-01-91	5654.1	2047	-293	0.0	1.0	94.9	4.1	Y	-	N	-	Y	N	
1409	10-06-91	5662.7	2300	-47	0.0	1.0	95.1	3.9	-	-	Y	-	Y	Y	

QUALITY ACCEPTANCE TESTING - SPECIFICATIONS COMPARISON REPORT REPORT NUMBER: TI.0

TEST NUMBER	DATE	ELEV	LOCATION STATION	LOCATION OFFSET	% COBBL	% GRAV	% SAND	% FINES	% COMPACTION DESIGN >= 50%	MOISTURE IN SPEC %- %	GRADATION IN SPEC	GRAVELS IN SPEC > %	FINES IN SPEC < 5 %	TEST IN SPEC	STATUS FAILED TESTS
1411	10-06-91	5661.4	1271	-50	0.0	1.0	96.2	2.8	-	-	N	-	Y	N	
1471	10-15-91	5667.7	1262	-42	0.0	7.0	89.3	3.7	Y	-	Y	-	Y	Y	
1498	10-21-91	5667.2	2164	-295	0.0	1.0	94.0	5.0	Y	-	Y	-	Y	Y	
1608	04-13-92	5666.9	1244	-371	0.0	7.0	87.4	**5.6**	Y	-	N	-	N	N	
1611	04-15-92	5667.9	1269	-140	0.0	8.0	84.2	**7.8**	Y	-	N	-	N	N	
1647	04-27-92	5671.8	2282	-76	0.0	1.0	94.4	4.6	Y	-	Y	-	Y	Y	
1648	04-27-92	5672.0	2241	-117	0.0	1.0	95.3	3.7	Y	-	Y	-	Y	Y	
1673	04-30-92	5670.7	1248	-307	0.0	1.0	95.3	3.7	Y	-	Y	-	Y	Y	
1738	05-18-92	5680.9	2248	-214	0.0	12.0	83.9	4.1	Y	-	Y	-	Y	Y	
1744	05-20-92	5689.7	2290	-92	0.0	9.0	85.8	**5.2**	Y	-	N	-	N	N	
1760	05-28-92	5683.4	1248	-200	0.0	1.0	97.1	1.9	N	-	Y	-	Y	N	RW,RT
1760A	05-30-92	5683.4	1248	-200	0.0	1.0	97.1	1.9	Y	-	Y	-	Y	Y	
1793	06-03-92	5690.2	2307	-300	0.0	0.0	96.5	3.5	Y	-	Y	-	Y	Y	
1805	06-05-92	5692.5	1226	-56	0.0	1.0	93.4	**5.6**	Y	-	N	-	N	N	
1814	06-08-92	5692.5	2348	-219	0.0	1.0	94.9	4.1	Y	-	Y	-	Y	Y	
1831	06-10-92	5695.7	1234	-50	0.0	1.0	94.3	4.7	-	-	Y	-	Y	Y	
1843	06-12-92	5697.7	2340	-224	0.0	1.0	94.5	4.5	Y	-	Y	-	Y	Y	
1857	06-19-92	5702.5	2416	-100	0.0	0.0	97.0	3.0	N	-	Y	-	Y	N	RW
1892	06-25-92	5705.1	1218	-40	0.0	0.0	96.7	3.3	N	-	Y	-	Y	N	RW
1954	07-08-92	5711.4	1216	-69	0.0	1.0	95.5	3.5	Y	-	Y	-	Y	Y	
1961	07-09-92	5709.5	2381	-200	0.0	0.0	97.6	2.4	N	-	N	-	Y	N	OLD
1975	07-11-92	5714.9	2414	-155	0.0	0.0	97.9	2.1	-	-	Y	-	Y	Y	
1982	07-16-92	5714.3	1207	-140	0.0	0.0	97.3	2.7	N	-	Y	-	Y	N	OLD
2011	07-20-92	5717.5	2457	-94	0.0	0.0	96.9	3.1	Y	-	Y	-	Y	Y	
2024	07-22-92	5721.3	1199	-142	0.0	1.0	96.3	2.7	Y	-	Y	-	Y	Y	
2047	07-28-92	5720.2	2413	-250	0.0	0.0	97.3	2.7	Y	-	N	-	Y	N	
2072	07-30-92	5723.5	2469	-100	0.0	3.0	94.2	2.8	-	-	N	-	Y	N	
2074	07-30-92	5727.9	1180	-200	0.0	0.0	96.2	3.8	-	-	N	-	Y	N	
2080	07-31-92	5729.0	1184	-175	0.0	10.0	86.3	3.7	-	-	Y	-	Y	Y	
2089	08-01-92	5725.1	2496	-48	0.0	8.0	88.2	3.8	-	-	Y	-	Y	Y	
2171	08-14-92	5740.1	2498	-150	0.0	10.0	86.1	3.9	Y	-	Y	-	Y	Y	
2243	08-28-92	5761.7	1119	-128	0.0	12.0	83.6	4.4	Y	-	Y	-	Y	Y	
2296	09-11-92	5770.5	2608	-84	0.0	10.0	85.7	4.3	Y	-	Y	-	Y	Y	
2326	09-17-92	5778.1	2625	-88	0.0	6.0	85.8	**8.2**	Y	-	N	-	N	N	

NOTE: These statistics include only results of tests that are NOT designated as RM, RW, or RW,RT.

	% COMPACTION	MOISTURE	GRADATION	GRAVELS	FINES	TEST IN SPEC
FAILING TEST LOCATIONS	8	0	22	0	14	27
PASSING TEST LOCATIONS	48	0	49	0	57	44
TOTAL TEST LOCATIONS	56	0	71	0	71	71
% FAILING TEST LOCATIONS	14.3	0.0	31.0	0.0	19.7	38.0

REMARKS LEGEND

RM - Test Location Removed
RW - Test Loc. Reworked and NOT Retested
RW,RT - Test Loc. Reworked and Retested
AR - Additional Rolling at Test Location

TEST LOCATIONS REWORKED - UNTESTED..	2
TEST LOCATIONS REWORKED - RETESTED..	2
TEST LOCATIONS REMOVED.............	2
FAILED TEST LOCATIONS NOT REWORKED OR RETESTED..	27
PERCENT OF FAILED TEST LOCATIONS NOT REWORKED OR RETESTED IN PERMANENT FILL..	38.0

COMMENT: THIS REPORT COVERS THE ENTIRE CONSTRUCTION OF THE DAM.

LAB CHIEF: ____________________

SUBMITTED BY: ____________________
PROJECT ENGINEER

QUALITY ACCEPTANCE TESTING - GRADATIONS REPORT	REPORT NUMBER: TI.1	PAGE 1 OF 2
PROJECT: LITTLE DELL LAKE, DAM AND APPURTENANCES RIVER: SALT LAKE CITY STREAMS STATE: UTAH TOWN: SALT LAKE CITY	CONTRACT NO. DACW05-89-C-0045 CONTRACTOR: CLEMENT BROTHERS AND J.E. STARNES CO.	DATE OF REPORT: 12-10-92 01-01-90 THRU 12-31-92

EMBANKMENT ZONE	MIN. RELATIVE DENS.	SPEC. W.C. % RANGE	LOOSE LIFT THICK. (IN)	NUMBER OF PASSES	COMPACTION EQUIPMENT
TRANSITION I	50	---	12	2	IR SD150D

TEST NUMBER	DATE	ELEV	LOCATION		GRADATION - PERCENT PASSING										LL	PI	CLASSIFICATION
			STATION	OFFSET	1.5IN	3/4IN	3/8IN	# 4	# 10	# 20	# 40	#100	#200				
497	09-29-90	5580.0	1522	-57	100.0	100.0	100.0	94.0	69.0	49.5	40.0	12.0	4.0				SP
504	10-03-90	5579.0	1500	-100	100.0	100.0	100.0	100.0	63.0	41.0	32.0	8.0	3.0				SP
507	10-04-90	5580.4	1485	-85	100.0	100.0	100.0	99.0	69.0	50.0	40.0	10.0	4.0				SP
515	10-05-90	5579.8	1450	-140	100.0	100.0	100.0	99.0	66.0	45.0	36.0	11.0	4.0				SP
526	10-11-90	5579.5	1596	-100	100.0	100.0	100.0	93.0	70.0	51.0	41.0	12.0	4.0				SP
563	10-24-90	5580.0	1540	-125	100.0	100.0	100.0	97.0	72.0	52.0	42.0	14.0	4.0				SP
661	05-17-91	5577.4	1590	-225	100.0	100.0	100.0	90.0	61.0	44.0	36.0	13.0	4.5				SP
655	05-16-91	5578.4	1600	-180	100.0	100.0	100.0	96.0	67.0	47.0	38.0	12.0	4.0				SP
673	05-20-91	5579.3	1730	-440	100.0	100.0	100.0	89.0	59.0	42.0	34.0	11.0	2.9				SP
675	05-20-91	5579.6	1682	-480	100.0	100.0	100.0	92.0	66.0	48.0	39.0	13.0	3.4				SP
681	05-22-91	5581.1	1715	-335	100.0	100.0	100.0	93.0	64.0	46.0	38.0	14.0	***5.2***				SP-SC/SM
688	05-24-91	5571.0	1533	-310	100.0	100.0	100.0	97.0	67.0	47.0	36.0	12.0	5.0				SP-SC/SM
708	06-04-91	5579.0	1410	-281	100.0	100.0	100.0	96.0	64.0	43.0	32.0	13.0	***5.7***				SP-SC/SM
715	06-05-91	5574.0	1407	-340	100.0	100.0	100.0	97.0	67.0	46.0	35.0	13.0	***6.2***				SP-SC/SM
717	06-05-91	5573.0	1408	-365	100.0	100.0	100.0	95.0	64.0	45.0	35.0	13.0	***6.2***				SP-SC/SM
726	06-06-91	5568.5	1430	-460	100.0	100.0	100.0	94.0	66.0	46.0	37.0	13.0	***5.4***				SP-SC/SM
731	06-07-91	5577.2	1440	-575	100.0	100.0	100.0	96.0	67.0	48.0	39.0	13.0	***6.1***				SP-SC/SM
742	06-10-91	5561.0	1456	-652	100.0	100.0	100.0	97.0	67.0	46.0	36.0	13.0	***5.3***				SP-SC/SM
743	06-10-91	5561.4	1436	-720	100.0	100.0	100.0	97.0	69.0	48.0	38.0	14.0	***6.1***				SP-SC/SM
752	06-12-91	5565.9	1500	-670	100.0	100.0	100.0	100.0	64.0	41.0	32.0	10.0	4.0				SP
763	06-14-91	5579.7	1400	-370	100.0	100.0	100.0	96.0	64.0	43.0	33.0	11.0	4.4				SP
766	06-14-91	5571.3	1555	-575	100.0	100.0	100.0	100.0	72.0	51.0	41.0	12.0	4.7				SP
776	06-17-91	5579.7	1600	-669	100.0	100.0	100.0	100.0	63.0	39.0	30.0	10.0	3.7				SP
797	06-22-91	5588.2	1392	-295	100.0	100.0	100.0	100.0	72.0	48.0	37.0	12.0	4.4				SP
803	06-24-91	5567.0	1365	-598	100.0	100.0	100.0	100.0	70.0	50.0	40.0	12.0	4.6				SP
809	06-25-91	5587.7	1700	-300	100.0	100.0	100.0	100.0	69.0	49.0	39.0	11.0	4.5				SP
821	06-26-91	5581.4	1640	-530	100.0	100.0	99.0	99.0	67.0	46.0	36.0	10.0	3.8				SP
971	07-26-91	5603.2	1345	-380	100.0	100.0	100.0	90.0	63.0	49.0	42.0	18.0	***7.1***				SP-SC/SM
958A	07-29-91	5602.5	1365	-180	100.0	100.0	100.0	100.0	72.0	51.0	38.0	10.0	3.7				SP
989	07-31-91	5605.3	1370	-375	100.0	100.0	100.0	100.0	73.0	51.0	38.0	10.0	4.1				SP
1080	08-13-91	5615.5	1374	-530	100.0	100.0	100.0	93.0	73.0	57.0	38.0	12.0	4.8				SP
1131	08-20-91	5639.2	1800	-300	100.0	100.0	100.0	96.0	76.0	60.0	42.0	15.0	***6.1***				SP-SC/SM
1135	08-21-91	5626.8	1965	-206	100.0	100.0	100.0	95.0	82.0	***70.0***	49.0	16.0	4.7				SP
1143	08-22-91	5629.4	1308	-190	100.0	100.0	100.0	97.0	71.0	54.0	34.0	13.0	4.3				SP
1191	08-24-91	5631.8	1990	-210	100.0	100.0	100.0	99.0	63.0	45.0	36.0	9.0	3.3				SP
1248	08-31-91	5632.7	2000	-190	100.0	100.0	100.0	97.0	68.0	49.0	30.0	12.0	3.8				SP
1280	09-06-91	5643.0	1285	-250	100.0	100.0	100.0	99.0	76.0	54.0	35.0	13.0	3.4				SP
1308	09-17-91	5646.4	1945	-300	100.0	100.0	100.0	98.0	74.0	55.0	34.0	12.0	3.4				SP
1323	09-20-91	5647.3	1991	-231	100.0	100.0	100.0	88.0	65.0	50.0	35.0	13.0	***5.4***				SP-SC/SM
1332	09-22-91	5647.4	1991	-231	100.0	100.0	100.0	98.0	80.0	60.0	37.0	14.0	3.9				SP
1351	09-25-91	5654.6	1280	-145	100.0	100.0	100.0	98.0	79.0	54.0	***24.0***	7.0	2.1				SP
1375	10-01-91	5654.1	2047	-293	100.0	100.0	100.0	99.0	***83.0***	57.0	30.0	12.0	4.1				SP
1409	10-06-91	5662.7	2300	-47	100.0	100.0	100.0	99.0	78.0	52.0	31.0	11.0	3.9				SP

QUALITY ACCEPTANCE TESTING - GRADATIONS REPORT REPORT NUMBER: TI.1

TEST NUMBER	DATE	ELEV	LOCATION		GRADATION - PERCENT PASSING										LL	PI	CLASSIFICATION
			STATION	OFFSET	1.5IN	3/4IN	3/8IN	# 4	# 10	# 20	# 40	#100	#200				
1411	10-06-91	5661.4	1271	-50	100.0	100.0	100.0	99.0	76.0	49.0	***24.0***	8.0	2.8				SP
1471	10-15-91	5667.7	1262	-42	100.0	100.0	99.0	93.0	70.0	52.0	34.0	12.0	3.7				SP
1498	10-21-91	5667.2	2164	-295	100.0	100.0	100.0	99.0	81.0	59.0	35.0	15.0	5.0				SP-SC/SM
1608	04-13-92	5666.9	1244	-371	100.0	100.0	100.0	93.0	69.0	53.0	38.0	14.0	***5.6***				SP-SC/SM
1611	04-15-92	5667.9	1269	-140	100.0	100.0	100.0	92.0	72.0	58.0	46.0	15.0	***7.0***				SP-SC/SM
1647	04-27-92	5671.8	2282	-76	100.0	100.0	100.0	99.0	78.0	55.0	33.0	12.0	4.6				SP
1648	04-27-92	5672.0	2241	-117	100.0	100.0	100.0	99.0	79.0	57.0	34.0	11.0	3.7				SP
1673	04-30-92	5670.7	1248	-307	100.0	100.0	100.0	99.0	79.0	56.0	34.0	11.0	3.7				SP
1738	05-18-92	5680.9	2248	-214	100.0	100.0	99.0	88.0	63.0	47.0	36.0	12.0	4.1				SP
1744	05-20-92	5689.7	2290	-92	100.0	100.0	100.0	91.0	70.0	55.0	43.0	14.0	***5.2***				SP-SC/SM
1760	05-28-92	5683.4	1248	-200	100.0	100.0	100.0	99.0	81.0	56.0	32.0	8.0	1.9				SP
1760A	05-30-92	5683.4	1248	-200	100.0	100.0	100.0	99.0	81.0	56.0	32.0	8.0	1.9				SP
1793	06-03-92	5690.2	2307	-300	100.0	100.0	100.0	100.0	78.0	52.0	32.0	11.0	3.5				SP
1805	06-05-92	5692.5	1226	-56	100.0	100.0	100.0	99.0	77.0	51.0	32.0	13.0	***5.6***				SP-SC/SM
1814	06-08-92	5692.5	2348	-219	100.0	100.0	100.0	99.0	75.0	47.0	28.0	10.0	4.1				SP
1831	06-10-92	5695.7	1234	-50	100.0	100.0	100.0	99.0	79.0	52.0	34.0	12.0	4.7				SP
1843	06-12-92	5697.7	2340	-224	100.0	100.0	100.0	99.0	77.0	52.0	33.0	11.0	4.5				SP
1857	06-19-92	5702.5	2416	-100	100.0	100.0	100.0	100.0	74.0	42.0	27.0	11.0	3.0				SP
1892	06-25-92	5705.1	1218	-40	100.0	100.0	100.0	100.0	73.0	39.0	25.0	11.0	3.3				SP
1954	07-08-92	5711.4	1216	-69	100.0	100.0	100.0	99.0	80.0	47.0	30.0	12.0	3.5				SP
1961	07-09-92	5709.5	2381	-200	100.0	100.0	100.0	100.0	***84.0***	48.0	31.0	12.0	2.4				SP
1975	07-11-92	5714.9	2414	-155	100.0	100.0	100.0	100.0	78.0	40.0	25.0	9.0	2.1				SP
1982	07-16-92	5714.3	1207	-140	100.0	100.0	100.0	100.0	80.0	42.0	26.0	10.0	2.7				SP
2011	07-20-92	5717.5	2457	-94	100.0	100.0	100.0	100.0	80.0	46.0	31.0	12.0	3.1				SP
2024	07-22-92	5721.3	1199	-142	100.0	100.0	100.0	99.0	75.0	42.0	28.0	11.0	2.7				SP
2047	07-28-92	5720.2	2413	-250	100.0	100.0	100.0	100.0	72.0	***36.0***	***23.0***	11.0	2.7				SP
2072	07-30-92	5723.5	2469	-100	100.0	100.0	100.0	97.0	65.0	***36.0***	25.0	10.0	2.8				SP
2074	07-30-92	5727.9	1180	-200	100.0	100.0	100.0	100.0	69.0	***35.0***	***24.0***	12.0	3.8				SP
2080	07-31-92	5729.0	1184	-175	100.0	100.0	100.0	90.0	60.0	43.0	33.0	11.0	3.7				SP
2088	08-01-92	5725.1	2496	-48	100.0	100.0	100.0	92.0	60.0	42.0	32.0	10.0	3.8				SP
2171	08-14-92	5740.1	2498	-150	100.0	100.0	99.0	90.0	63.0	47.0	36.0	11.0	3.9				SP
2243	08-28-92	5761.7	1119	-128	100.0	100.0	100.0	88.0	63.0	49.0	38.0	13.0	4.4				SP
2296	09-11-92	5770.5	2608	-84	100.0	100.0	100.0	90.0	65.0	51.0	40.0	13.0	4.3				SP
2326	09-17-92	5778.1	2625	-88	100.0	100.0	100.0	94.0	74.0	47.0	34.0	15.0	***8.2***				SP-SM/SC

NOTE - Emphasized Numbers indicate percent passing outside of gradation range specified.

COMMENT: THIS REPORT COVERS THE ENTIRE CONSTRUCTION OF THE DAM.

LAB CHIEF: ______________________

SUBMITTED BY: ______________________
PROJECT ENGINEER

QUALITY ACCEPTANCE TESTING - COMPACTION REPORT	REPORT NUMBER: TI.2	PAGE 1 OF 3

PROJECT: LITTLE DELL LAKE, DAM AND APPURTENANCES RIVER: SALT LAKE CITY STREAMS STATE: UTAH TOWN: SALT LAKE CITY	CONTRACT NO. DACW05-89-C-0045 CONTRACTOR: CLEMENT BROTHERS AND J.E. STARNES CO.	DATE OF REPORT: 12-10-92 01-01-90 THRU 12-31-92

EMBANKMENT ZONE	MIN. RELATIVE DENS.	SPEC. W.C. % RANGE	LOOSE LIFT THICK. (IN)	NUMBER OF PASSES	COMPACTION EQUIPMENT
TRANSITION I	50		12	2	IR SD150D

TEST NUMBER	DATE	ELEV	LOCATION		FIELD		STANDARD LAB COMPACTION			RELATIVE DENSITY	PERCENT +- OMC	CLASSIFICATION
			STATION	OFFSET	DRY DENS (PCF)	MC %	TEST METH	MX DRY DEN	MN DRY DEN			
497	09-29-90	5580.0	1522	-57	122.6	8.1	RD/497	127.9	106.0	79.1		SP
504	10-03-90	5579.0	1500	-100	117.7	3.0	H/515	129.2	105.6	56.3		SP
507	10-04-90	5580.4	1485	-85	122.4	4.8	RD/507	128.2	105.4	78.1		SP
515	10-05-90	5579.8	1450	-140	127.4	5.9	RD/515	129.2	105.6	93.7		SP
526	10-11-90	5579.5	1596	-100	124.5	5.2	RD/526	124.2	105.5	100.0		SP
563	10-24-90	5580.0	1540	-125	112.3	7.1	RD/563	124.1	104.9	***42.6***		SP
661	05-17-91	5577.4	1590	-225	121.8	6.4	RD/661	128.5	100.7	80.1		SP
655	05-16-91	5578.4	1600	-180	119.3	6.5	RD/655	125.7	107.4	68.5		SP
673	05-20-91	5579.3	1730	-440	118.7	5.1	RD/673	125.7	104.3	71.3		SP
675	05-20-91	5579.6	1682	-480	117.2	6.7	RD/675	122.8	103.7	74.1		SP
681	05-22-91	5581.1	1715	-335	118.0	6.3	H/661	128.5	100.7	67.8		SP-SC/SM
688	05-24-91	5571.0	1533	-310	119.6	8.3	H/661	128.5	100.7	73.0		SP-SC/SM
708	06-04-91	5579.0	1410	-281	117.4	10.4	RD/708	126.5	98.0	73.3		SP-SC/SM
715	06-05-91	5574.0	1407	-340								SP-SC/SM
717	06-05-91	5573.0	1408	-365	118.0	8.7	RD/717	128.9	97.5	71.3		SP-SC/SM
726	06-06-91	5568.5	1430	-460								SP-SC/SM
731	06-07-91	5577.2	1440	-575	111.9	9.1	RD/731	128.8	101.5	***43.8***		SP-SC/SM
742	06-10-91	5561.0	1456	-652	117.6	7.8	RD/742	127.2	94.2	76.7		SP-SC/SM
743	06-10-91	5561.4	1436	-720	117.0	8.5	RD/743	127.8	97.5	70.3		SP-SC/SM
752	06-12-91	5565.9	1500	-670	125.3	6.6	RD/752	126.6	105.6	94.8		SP
763	06-14-91	5579.7	1400	-370	117.8	5.8	RD/763	130.5	99.6	65.2		SP
766	06-14-91	5571.3	1555	-575	114.5	9.7	RD/766	132.1	105.8	***38.2***		SP
776	06-17-91	5579.7	1600	-669	115.3	6.2	RD/776	126.7	106.4	***48.2***		SP
797	06-22-91	5588.2	1392	-295	111.8	6.8	RD/797	122.6	106.3	***37.0***		SP
803	06-24-91	5567.0	1365	-598	116.4	8.4	RD/803	126.5	107.0	52.4		SP
809	06-25-91	5587.7	1700	-300	122.8	6.5	RD/809	126.3	106.4	84.8		SP
821	06-26-91	5581.4	1640	-530	113.8	3.5	RD/821	122.7	105.4	52.4		SP
971	07-26-91	5603.2	1345	-380	123.9	11.1	RD/971	130.8	105.0	77.3		SP-SC/SM
958A	07-29-91	5602.5	1365	-180	117.6	5.7	H/982	124.1	105.8	68.0		SP
989	07-31-91	5605.3	1370	-375	118.0	7.5	RD/989	119.8	104.2	89.8		SP
1080	08-13-91	5615.5	1374	-530	116.7	8.1	RD/1082	124.7	102.6	68.2		SP
1131	08-20-91	5639.2	1800	-300	112.9	7.6	RD/1131	121.6	99.1	66.1		SP-SC/SM
1135	08-21-91	5626.8	1965	-206			RD/1135	118.6	97.9			SP
1143	08-22-91	5629.4	1308	-190								SP
1191	08-24-91	5631.8	1990	-210								SP
1248	08-31-91	5632.7	2000	-190	120.0	7.8	RD/1248	119.9	99.7	100.0		SP
1280	09-06-91	5643.0	1285	-250	108.2	7.6	RD/1280	116.6	98.9	56.6		SP
1308	09-17-91	5646.4	1945	-300								SP
1323	09-20-91	5647.3	1991	-231	115.5	8.6	RD/1323	127.8	100.9	60.1		SP-SC/SM
1332	09-22-91	5647.4	1991	-231								SP
1351	09-25-91	5654.6	1280	-145	107.1	4.9	RD/1351	118.2	99.1	***46.2***		SP
1375	10-01-91	5654.1	2047	-293	111.9	9.6	RD/1375	118.0	97.4	74.2		SP
1409	10-06-91	5662.7	2300	-47								SP

TEST NUMBER	DATE	ELEV	LOCATION		FIELD		STANDARD LAB COMPACTION			RELATIVE DENSITY	PERCENT +- OMC	CLASSIFICATION
			STATION	OFFSET	DRY DENS (PCF)	MC %	TEST METH	MX DRY DEN	MN DRY DEN			
1411	10-06-91	5661.4	1271	-50								SP
1471	10-15-91	5667.7	1262	-42	110.7	7.9	RD/1471	122.9	98.7	55.1		SP
1498	10-21-91	5667.2	2164	-295	110.2	8.0	RD/1498	121.8	97.0	58.8		SP-SC/SM
1608	04-13-92	5666.9	1244	-371	113.9	7.9	RD/1608	119.0	96.9	80.4		SP-SC/SM
1611	04-15-92	5667.9	1269	-140	113.4	9.8	RD/1611	120.5	92.9	78.9		SP-SC/SM
1647	04-27-92	5671.8	2282	-76	110.0	8.9	RD/1648	116.4	99.3	66.2		SP
1648	04-27-92	5672.0	2241	-117	110.9	6.2	RD/1648	116.4	99.3	71.2		SP
1673	04-30-92	5670.7	1248	-307	108.1	6.2	RD/1673	120.8	95.2	56.3		SP
1738	05-18-92	5680.9	2248	-214	109.2	8.0	RD/1738	123.1	93.0	60.7		SP
1744	05-20-92	5689.7	2290	-92	114.0	10.2	RD/1744	120.8	100.7	70.1		SP-SC/SM
1760	05-28-92	5683.4	1248	-200	107.1	10.5	RD/1760	117.7	99.3	***46.6***		SP
1760A	05-30-92	5683.4	1248	-200	110.9	9.1	H/1760	117.7	99.3	66.9		SP
1793	06-03-92	5690.2	2307	-300	106.9	8.0	RD/1793	116.2	93.8	63.6		SP
1805	06-05-92	5692.5	1226	-56	114.3	10.9	RD/1805	117.0	99.7	86.4		SP-SC/SM
1814	06-08-92	5692.5	2348	-219	111.4	8.5	RD/1814	118.4	96.3	72.6		SP
1831	06-10-92	5695.7	1234	-50								SP
1843	06-12-92	5697.7	2340	-224	111.2	5.5	RD/1843	116.7	97.9	74.2		SP
1857	06-19-92	5702.5	2416	-100	104.0	11.1	RD/1857	119.8	97.4	***33.9***		SP
1892	06-25-92	5705.1	1218	-40	105.6	10.7	RD/1892	117.7	100.7	***32.1***		SP
1954	07-08-92	5711.4	1216	-69	113.7	7.0	RD/1954	116.1	97.0	89.3		SP
1961	07-09-92	5709.5	2381	-200	105.9	9.3	RD/1961	115.4	99.3	***44.7***		SP
1975	07-11-92	5714.9	2414	-155								SP
1982	07-16-92	5714.3	1207	-140	102.1	8.9	RD/1982	114.4	97.8	***29.8***		SP
2011	07-20-92	5717.5	2457	-94	111.1	6.6	RD/2012	114.7	94.0	85.3		SP
2024	07-22-92	5721.3	1199	-142	111.2	9.8	RD/2024	120.1	99.4	61.6		SP
2047	07-28-92	5720.2	2413	-250	109.8	6.9	RD/2045	114.9	99.3	70.4		SP
2072	07-30-92	5723.5	2469	-100								SP
2074	07-30-92	5727.9	1180	-200								SP
2080	07-31-92	5729.0	1184	-175								SP
2088	08-01-92	5725.1	2496	-48								SP
2171	08-14-92	5740.1	2498	-150	117.0	10.8	RD/2171	121.0	101.2	82.5		SP
2243	08-28-92	5761.7	1119	-128	120.7	7.5	RD/2243	120.2	96.8	100.0		SP
2296	09-11-92	5770.5	2608	-84	113.5	7.8	RD/2296	118.4	98.2	79.0		SP
2326	09-17-92	5776.1	2625	-88	120.6	3.5	RD/2326	129.0	102.9	72.5		SP-SM/SC

QUALITY ACCEPTANCE TESTING - COMPACTION REPORT	REPORT NUMBER: TI.2	

TEST NUMBER	DATE	ELEV	LOCATION		FIELD		STANDARD LAB COMPACTION			RELATIVE DENSITY	PERCENT +- OMC	CLASSIFICATION
			STATION	OFFSET	DRY DENS (PCF)	MC %	TEST METH	MX DRY DEN	MN DRY DEN			

NOTE: Explanation of Column Headed TEST METH - 5/110 6

This indicates lab comparison type

All mold diameters are 12 inch unless noted here.

5 - 5 point proctor
1 or 2 - 1 or 2 point proctor
H - historical proctor
RD- relative density

proctor number used for comparison to field data

IN-PLACE - TEST RANGES FOR TESTS IN EMBANKMENT FOR THIS REPORT

FIELD DRY DENSITY	MIN	102.1	FIELD M.C.	MIN	3.0
FIELD DRY DENSITY	MAX	127.4	FIELD M.C.	MAX	10.9
FIELD DRY DENSITY	AVG	114.9	FIELD M.C.	AVG	7.4

(1) AVGERAGE PERCENT COMPACTION THIS REPORT 69.1

(1) AVERAGE PERCENT COMPACTION TO 12-31-92 69.1

COMMENT: THIS REPORT COVERS THE ENTIRE CONSTRUCTION OF THE DAM.

LAB CHIEF: ____________________

SUBMITTED BY: ____________________
PROJECT ENGINEER

(1) Note: Average % Compaction = Average Relative Density

QUALITY ACCEPTANCE TESTING - COMMENTS REPORT		REPORT NUMBER: TI.3	

PROJECT: LITTLE DELL LAKE, DAM AND APPURTENANCES RIVER: SALT LAKE CITY STREAMS STATE: UTAH TOWN: SALT LAKE CITY	CONTRACT NO. DACW05-89-C-0045 CONTRACTOR: CLEMENT BROTHERS AND J.E. STARNES CO.	DATE OF REPORT: 12-10-92 01-01-90 THRU 12-31-92

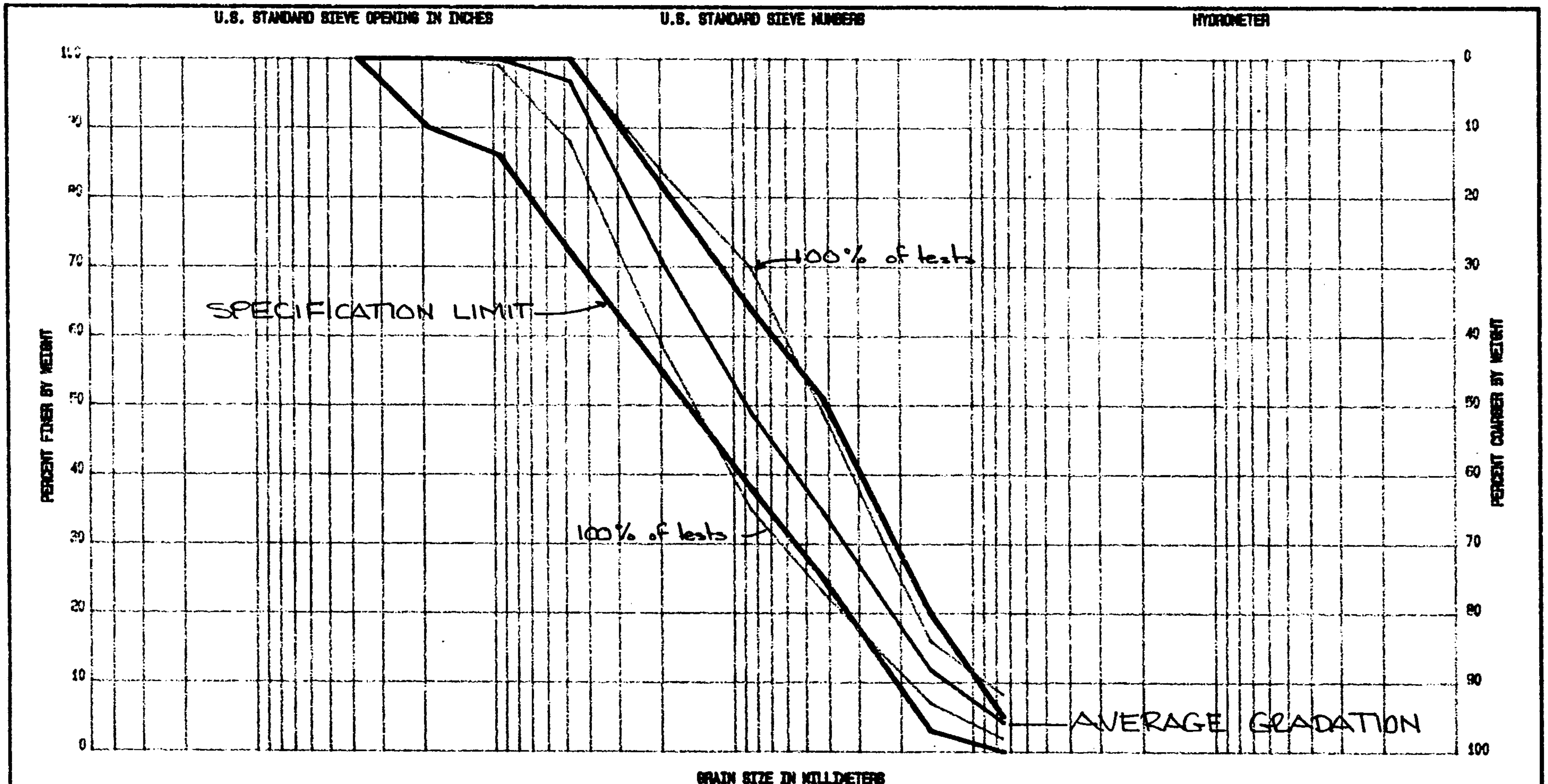
EMBANKMENT ZONE	MIN. RELATIVE DENS.	SPEC. W.C. % RANGE	LOOSE LIFT THICK. (IN)	NUMBER OF PASSES	COMPACTION EQUIPMENT
TRANSITION I	50		12	2	IR SD150D

TEST NUMBER	TEST IN SPEC	STATUS FAILED TESTS	TEST COMMENTS
497	Y		SOURCE-CRUSHER/HARPERS. DENS.GRAD.REL.DENS. FIRST PLACEMENT.
504	Y		SOURCE-CRUSHER/HARPERS. DENS.GRAD.REL.DENS.
507	Y		SOURCE-CRUSHER/HARPERS. DENS.GRAD.REL.DENS.
515	Y		SOURCE-CRUSHER/HARPERS. DENS.GRAD.REL.DENS.
526	Y		SOURCE-CRUSHER/HARPERS. DENS.GRAD.REL.DENS.
563	N	OLD	SOURCE-CRUSHER/HARPERS. DENS.GRAD.REL.DENS. DRAIN BLANKET.
661	Y		SOURCE-CRUSHER/HARPERS. DENS.GRAD.REL.DENS. RETEST OF 655.
655	Y	RW,RT	SOURCE-CRUSHER/HARPERS. DENS.GRAD.REL.DENS. REROLLED,RETESTED SEE 661.
673	Y		SOURCE-CRUSHER/HARPERS. DENS.GRAD.REL.DENS. RIGHT ABUTMENT TOE OF SLOPE.
675	Y		SOURCE-CRUSHER/HARPERS. DENS.GRAD.REL.DENS. RIGHT ABUTMENT TOE OF SLOPE.
681	N		SOURCE-CRUSHER/HARPERS. DENS.GRAD.REL.DENS. RIGHT ABUTMENT TOE OF SLOPE.
688	Y		SOURCE-CRUSHER/HARPERS. DENS.GRAD.
708	N		SOURCE-CRUSHER/HARPERS. DENS.GRAD.REL.DENS. LEFT ABUTMENT PLACEMENT.
715	N		SOURCE-CRUSHER/HARPERS. GRADATION ONLY. FIRST LIFT IN THIS AREA.
717	N		SOURCE-CRUSHER/HARPERS. DENS.GRAD.REL.DENS.
726	N		SOURCE-CRUSHER/HARPERS. GRADATION ONLY.
731	N	OLD	SOURCE-CRUSHER/HARPERS. DENS.GRAD.REL.DENS.
742	N		SOURCE-CRUSHER/HARPERS. DENS.GRAD.REL.DENS.
743	N		SOURCE-CRUSHER/HARPERS. DENS.GRAD.REL.DENS.
752	Y		SOURCE-HARPERS PRODUCT. DENS.GRAD.REL.DENS. FIRST PLACEMENT OF HARPERS TRUCKED IN SAND.
763	Y		SOURCE-HARPERS PRODUCT. DENS.GRAD.REL.DENS. LEFT ABUTMENT.
766	N	OLD	SOURCE-HARPERS PRODUCT. DENS.GRAD.REL.DENS. DRAIN BLANKET.
776	N	OLD	SOURCE-HARPERS PRODUCT. DENS.GRAD.REL.DENS. RIGHT ABUTMENT.
797	N	OLD	SOURCE-HARPERS PRODUCT. DENS.GRAD.REL.DENS., ONLY 2 PASSES LEFT ABUTMENT.
803	Y		SOURCE-HARPERS PRODUCT. DENS.GRAD.REL.DENS. DRAIN BLANKET.
809	Y		SOURCE-HARPERS PRODUCT. DENS.GRAD.REL.DENS., RIGHT ABUTMENT.
821	Y		SOURCE-HARPERS PRODUCT. DENS.GRAD.REL.DENS. RIGHT ABUTMENT.
971	N	RM	SOURCE-CRUSHER/HARPERS. DENS.GRAD.REL.DENS. LEFT ABUTMENT IR150D. REMOVED 290 TO 445D/S,210 TO 235D/S,40 TO 190D/S
958A	Y		SOURCE-HARPERS PRODUCT. DENS.GRAD.REL.DENS. LEFT ABUTMENT.
989	Y		SOURCE-HARPERS PRODUCT. DENS.GRAD.REL.DENS. LEFT ABUTMENT
1080	Y		SOURCE-RIDGEPOINT. DENS.GRAD.REL.DENS. LEFT ABUTMENT.IR150.
1131	N		SOURCE-NOT SPECIFIC. DENS.GRAD.REL.DENS. IR150.BENCH AREA 1850 TO 1950,250 TO 550 D/S. 100 BY 30 REMOVED.
1135	N		SOURCE-RIDGE POINT. GRAD.REL.DENS. RIGHT ABUTMENT,1800 TO 2050 , 220 TO 250 D/S. IR150. NO FIELD DENSITY.
1143	Y		SOURCE-RIDGEPOINT. GRADATION ONLY. LEFT ABUTMENT.
1191	Y		SOURCE-NOT STATED. GRADATION ONLY. RIGHT ABUTMENT.
1248	Y		SOURCE-NOT STATED. DENS.GRAD.REL.DENS. RIGHT ABUTMENT.IR150.
1280	Y		SOURCE-RIDGEPOINT. DENS.GRAD.REL.DENS. LEFT ABUTMENT.IR150.
1308	Y		SOURCE-NOT STATED. GRADATION ONLY. RIGHT ABUTMENT. IR150
1323	N	RM	SOURCE-NOT STATED. DENS.GRAD.REL.DENS. RIGHT ABUTMENT.MATERIAL REMOVED. SEE TEST 1332 ON NEW MATERIAL.
1332	Y		SOURCE-RIDGEPOINT. GRADATION ONLY. RETEST AFTER MATERIAL REMOVED AND REPLACED. SEE PRIOR TEST 1323.
1351	N	OLD	SOURCE-RIDGEPOINT. DENS.GRAD.REL.DENS. IR150.
1375	N		SOURCE-RIDGEPOINT. DENS.GRAD.REL.DENS. RIGHT ABUTMENT.
1409	Y		SOURCE-RIDGEPOINT. GRADATION ONLY. TEST OF SUSPECT MATERIAL,SEE ALSO 1408,1410,1411. CORE TRENCH,VARIANCE ZONE.

TEST NUMBER	TEST IN SPEC	STATUS FAILED TESTS	TEST COMMENTS
1411	N		SOURCE-RIDGEPOINT. GRADATION ONLY. TEST OF SUSPECT MATERIAL, SEE ALSO 1408,1409,1410. LEFT ABUTMENT.
1471	Y		SOURCE-NOT SPECIFIC,IMPORTED. DENS.GRAD.REL.DENS. LEFT ABUTMENT.
1498	Y		SOURCE-NOT STATED. DENS.GRAD.REL.DENS. RIGHT ABUTMENT.
1608	N		SOURCE-NOT SPECIFIC. DENS.GRAD.REL.DENS. LEFT ABUTMENT.-180 TO DS TOE. SEE ADDED TESTS 1608 A,B,C,D.
1611	N		SOURCE-NOT SPECIFIC. DENS.GRAD.REL.DENS.SEE ADDED TESTS 1611 A,B,C. LEFT ABUTMENT BLANKET DRAIN..
1647	Y		SOURCE-NOT SPECIFIC. DENS.GRAD.REL.DENS. RIGHT ABUTMENT BLANKET IN THE CORE TRENCH.
1648	Y		SOURCE-NOT SPECIFIC. DENS.GRAD.REL.DENS. RIGHT ABUTMENT BLANKET DRAIN.
1673	Y		SOURCE-HARPERS RAW MATERIAL. DENS.GRAD.REL.DENS. LEFT ABUTMENT BLANKET DRAIN.
1738	Y		SOURCE-NOT SPECIFIC. DENS.GRAD.REL.DENS. RIGHT ABUTMENT DRAIN BLANKET. CHIMNEY TO -260.
1744	N		SOURCE-OFF SITE. DENS.GRAD.REL.DENS. RIGHT ABUTMENT BLANKET DRAIN. AREA 2280 TO 2310,-90 TO -300. RIDGEPOINT.
1760	N	RW,RT	SOURCE-NOT SPECIFIC. DENS.GRAD.REL.DENS. LEFT ABUTMENT DRAIN BLANKET. AREA -35 TO -400. NOT REWORKED BUT RETESTED.
1760A	Y		SOURCE-SAME. DENSITY ONLY. RETEST OF 1760. GRADATION FROM 1760.
1793	Y		SOURCE-RIDGEPOINT. DENS.GRAD.REL.DENS. RIGHT ABUTMENT DRAIN BLANKET. AREA 2350 TO 2300,-150 TO -375.
1805	N		SOURCE-RIDGEPOINT. DENS.GRAD.REL.DENS. LEFT ABUTMENT DRAIN BLANKET.
1814	Y		SOURCE-RIDGEPOINT. DENS.GRAD.REL.DENS. RIGHT ABUTMENT DRAIN BLANKET.
1831	Y		SOURCE-RIDGEPOINT. GRADATION ONLY. LEFT ABUTMENT DRAIN BLANKET.
1843	Y		SOURCE-RIDGEPOINT. DENS.GRAD.PROC. AREA RIGHT ABUTMENT DRAIN BLANKET.
1857	N	RW	SOURCE-RIDGEPOINT. DENS.GRAD.REL.DENS.RIGHT ABUTMENT DRAIN BLANKET. LOW DENSITY. ADDITIONAL PASSES ADDED TO AREA.
1892	N	RW	SOURCE-RIDGEPOINT. DENS.GRAD.REL.DENS. LEFT ABUTMENT DRAIN BLANKET. CHIMNEY TO -330. AREA HAD ADDED COMPACTION.
1954	Y		SOURCE-RIDGEPOINT. DENS.GRAD.REL.DENS. LEFT ABUTMENT DRAIN BLANKET.
1961	N	OLD	SOURCE-RIDGEPOINT. DENS.GRAD.REL.DENS. RIGHT ABUTMENT DRAIN BLANKET.
1975	Y		SOURCE-RIDGEPOINT. GRADATION ONLY. RIGHT ABUTMENT DRAIN BLANKET. GRADATION CHECK ON PREVIOS OUT OF SPEC T1.
1982	N	OLD	SOURCE-RIDGEPOINT. DENS.GRAD.REL.DENS. LEFT ABUTMENT DRAIN BLANKET, CHIMNEY TO -280.
2011	Y		SOURCE-RIDGEPOINT. DENS.GRAD.REL.DENS. RIGHT ABUTMENT DRAIN BLANKET. SEE ALSO TEST 2012. TEST 1 FT DEEP.
2024	Y		SOURCE-RIDGEPOINT. DENS.GRAD.REL.DENS. LEFT ABUTMENT DRAIN BLANKET.
2047	N		SOURCE-RIDGEPOINT. DENS.GRAD.REL.DENS. RIGHT ABUTMENT DRAIN BLANKET. OUT OF SPEC COARSE.
2072	N		SOURCE-RIDGEPOINT. GRADATION ONLY. RIGHT ABUTMENT DRAIN BLANKET. OUT OF SPEC COARSE.
2074	N		SOURCE-RIDGEPOINT. GRADATION ONLY. LEFT ABUTMENT DRAIN BLANKET. OUT OF SPEC COARSE.
2080	Y		SOURCE-NOT SPECIFIC. GRADATION ONLY. LEFT ABUTMENT DRAIN BLANKET.
2088	Y		SOURCE-NOT SPECIFIC. GRADATION ONLY. RIGHT ABUTMENT DRAIN BLANKET.
2171	Y		SOURCE-NOT SPECIFIC. DENS.GRAD.REL.DENS. RIGHT ABUTMENT DRAIN BLANKET.
2243	Y		SOURCE-NOT SPECIFIC. DENS.GRAD.REL.DENS. LEFT ABUTMENT DRAIN BLANKET.
2296	Y		SOURCE-NOT SPECIFIC. DENS.GRAD.REL.DENS. RIGHT ABUTMENT DRAIN BLANKET.
2326	N		SOURCE-NOT SPECIFIC. DENS.GRAD.REL.DENS. RIGHT ABUTMENT DRAIN BLANKET.

COMMENT: THIS REPORT COVERS THE ENTIRE CONSTRUCTION OF THE DAM.

LAB CHIEF: ____________________ SUBMITTED BY: ____________________
PROJECT ENGINEER



Represents all test data from 1990. 1991. 1992

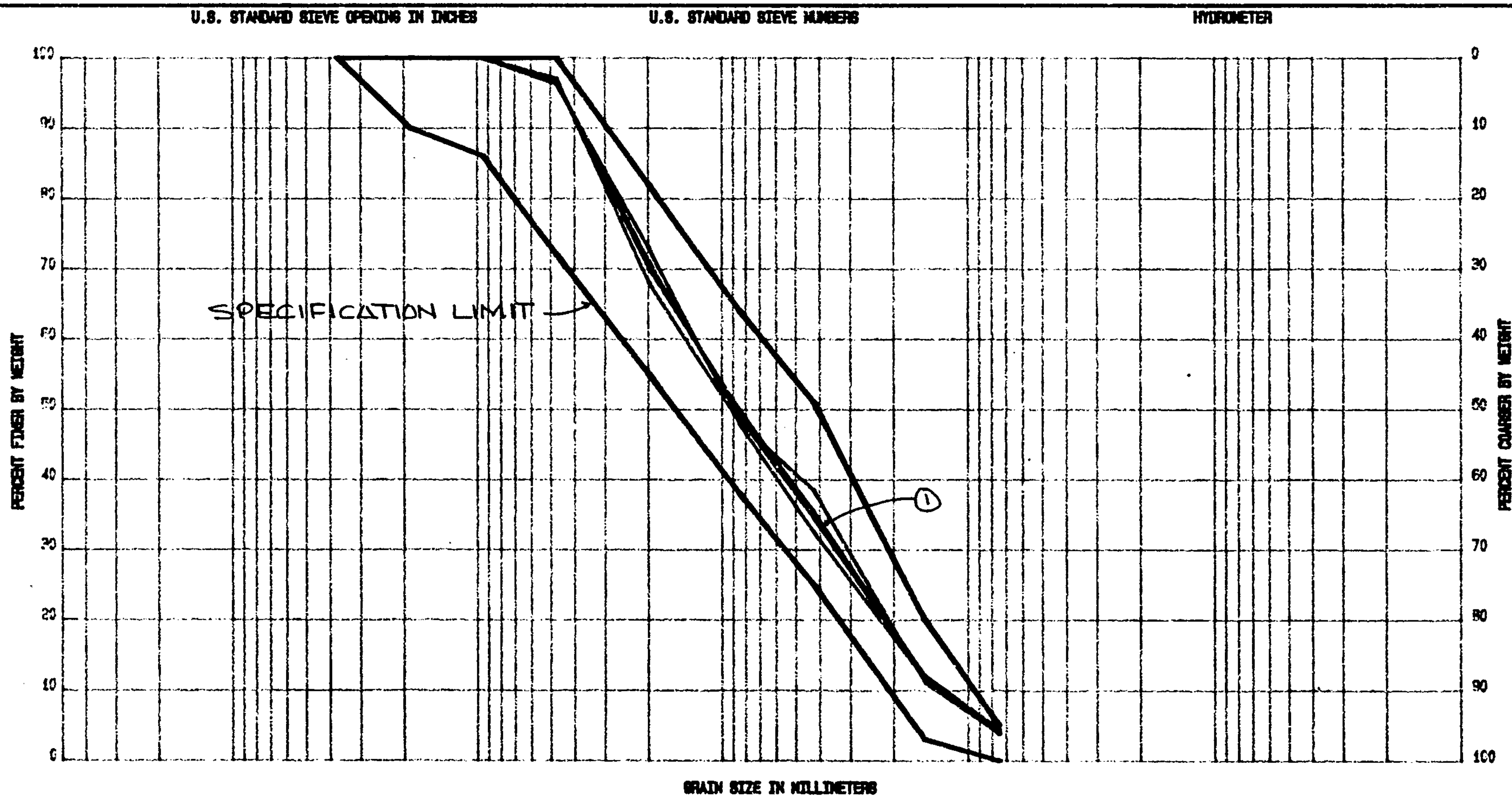
Project LITTLE DELL DAM

Area TRANSITION I

Boring No.

Date

GRADATION CURVES



1 1990, 1991, 1992

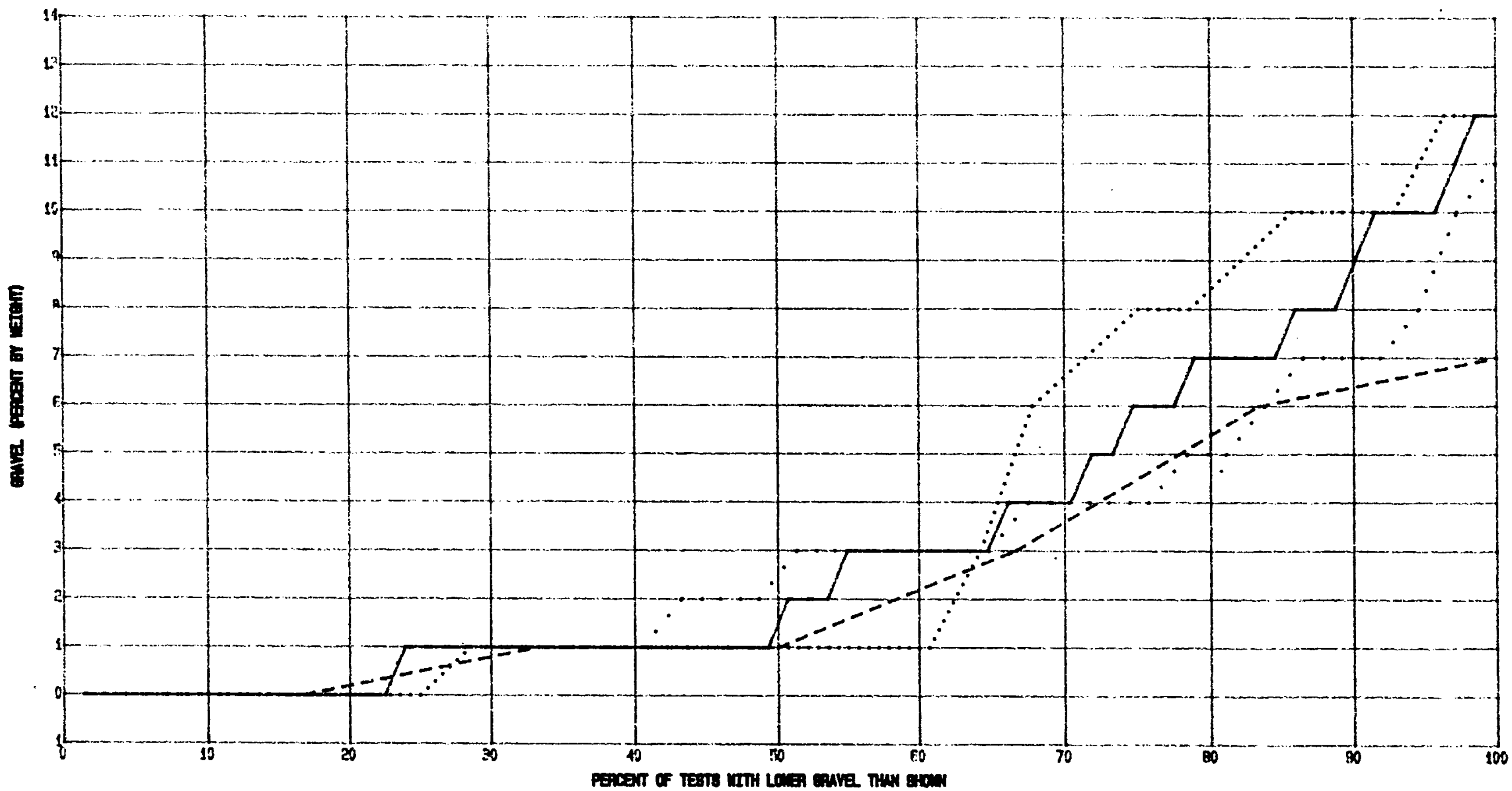
AVERAGE GRADATION CURVES BY YEAR

Project LITTLE DELL DAM

Area TRANSITION I

Boring No.

Date



Line Style	From Date	To Date	# Points	Mean	Std Dev	10 %	Median	90 %
....	01-01-92	12-31-92	28	3.75	4.334402	0	1	10
. . . . . .	01-01-91	12-31-91	37	3.054054	2.933898	0	2	7
— — — —	01-01-90	12-31-90	6	3	2.898275	0	1	6
———	01-01-90	12-31-92	71	3.323944	3.520449	0	1	8

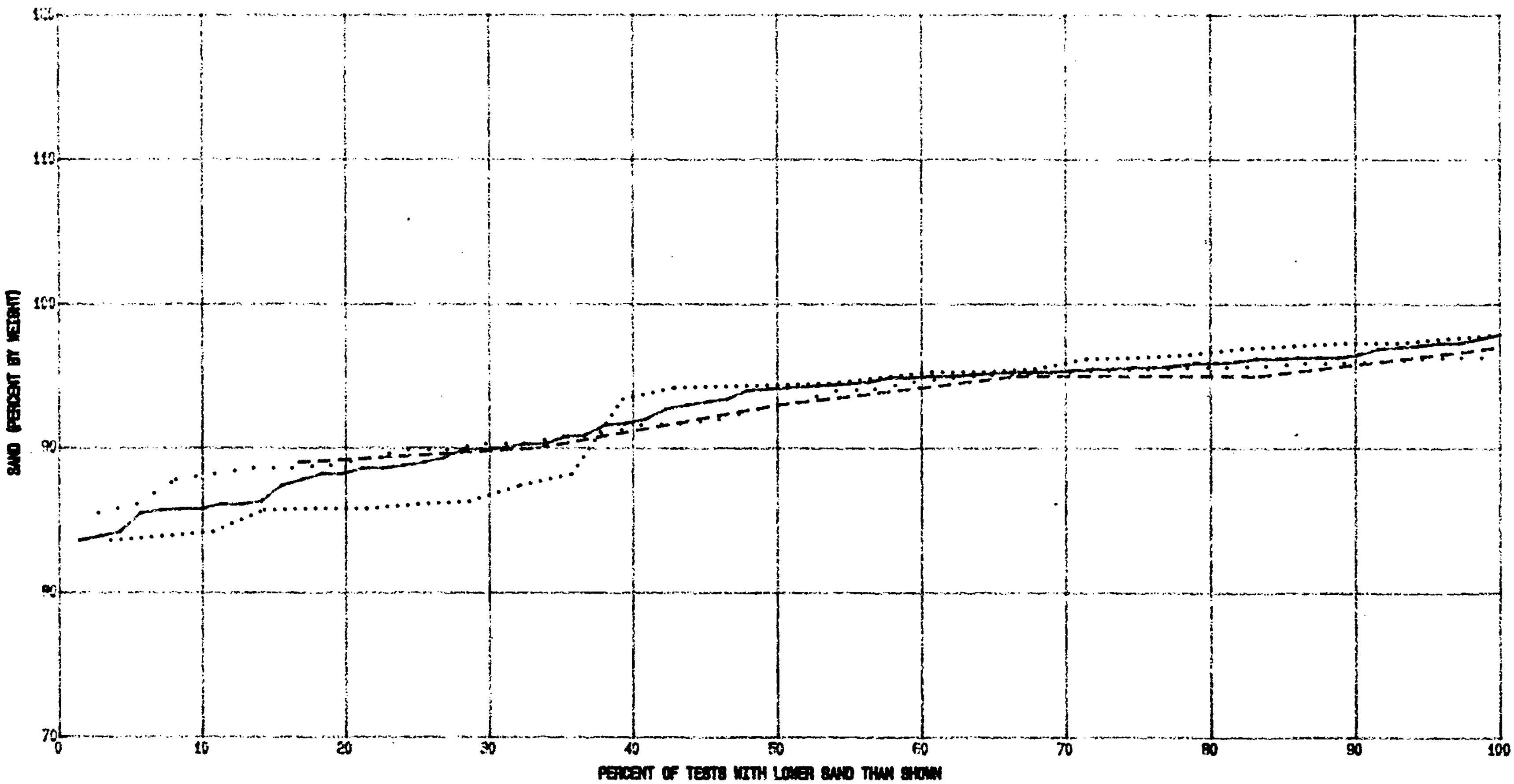
GRAVEL - S-CURVE

Project LITTLE DELL DAM

Area TRANSITION I

Boring No.

Date



Line Style	From Date	To Date	# Points	Mean	Std Dev	10 %	Median	90 %
....	01-01-92	12-31-92	28	92.21073	5.129708	83.9	94.3	97.3
. . . . . .	01-01-91	12-31-91	37	92.53513	3.236062	87.8	92.7	95.9
— — — — —	01-01-90	12-31-90	6	93.16666	3.125167	0	90	95
————	01-01-90	12-31-92	71	92.46065	4.039204	85.8	94.1	96.3

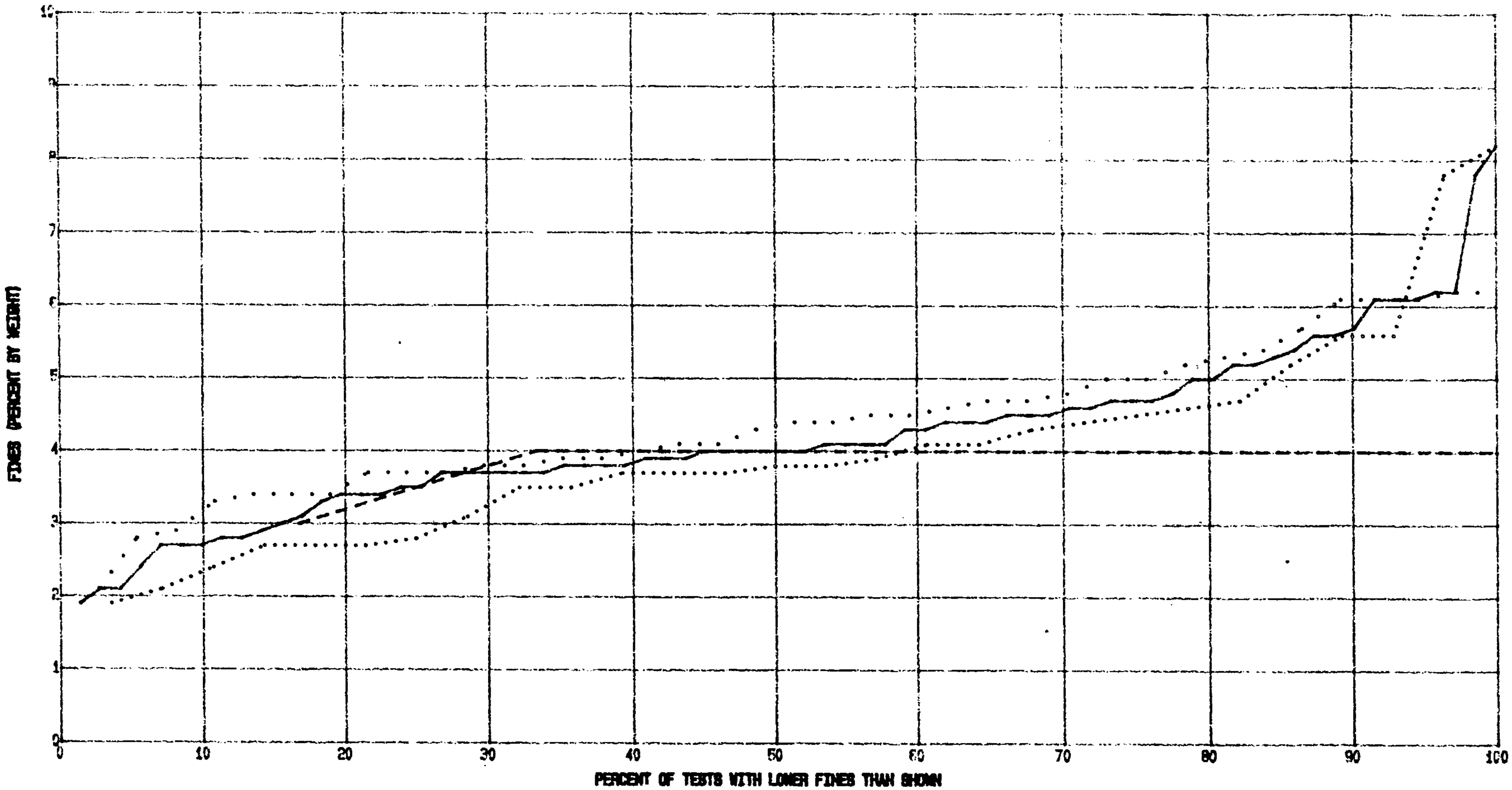
SAND - S-CURVE

Project LITTLE DELL DAM

Area TRANSITION I

Boring No.

Date



Line Style	From Date	To Date	# Points	Mean	Std Dev	10 %	Median	90 %
....	01-01-92	12-31-92	28	4.039285	1.474812	2.1	3.7	5.8
. . . . . .	01-01-91	12-31-91	37	4.410811	1.024094	2.9	4.3	6.1
– – – – –	01-01-90	12-31-90	6	3.833333	.4082483	0	4	4
———	01-01-90	12-31-92	71	4.215494	1.198045	2.7	4	5.6

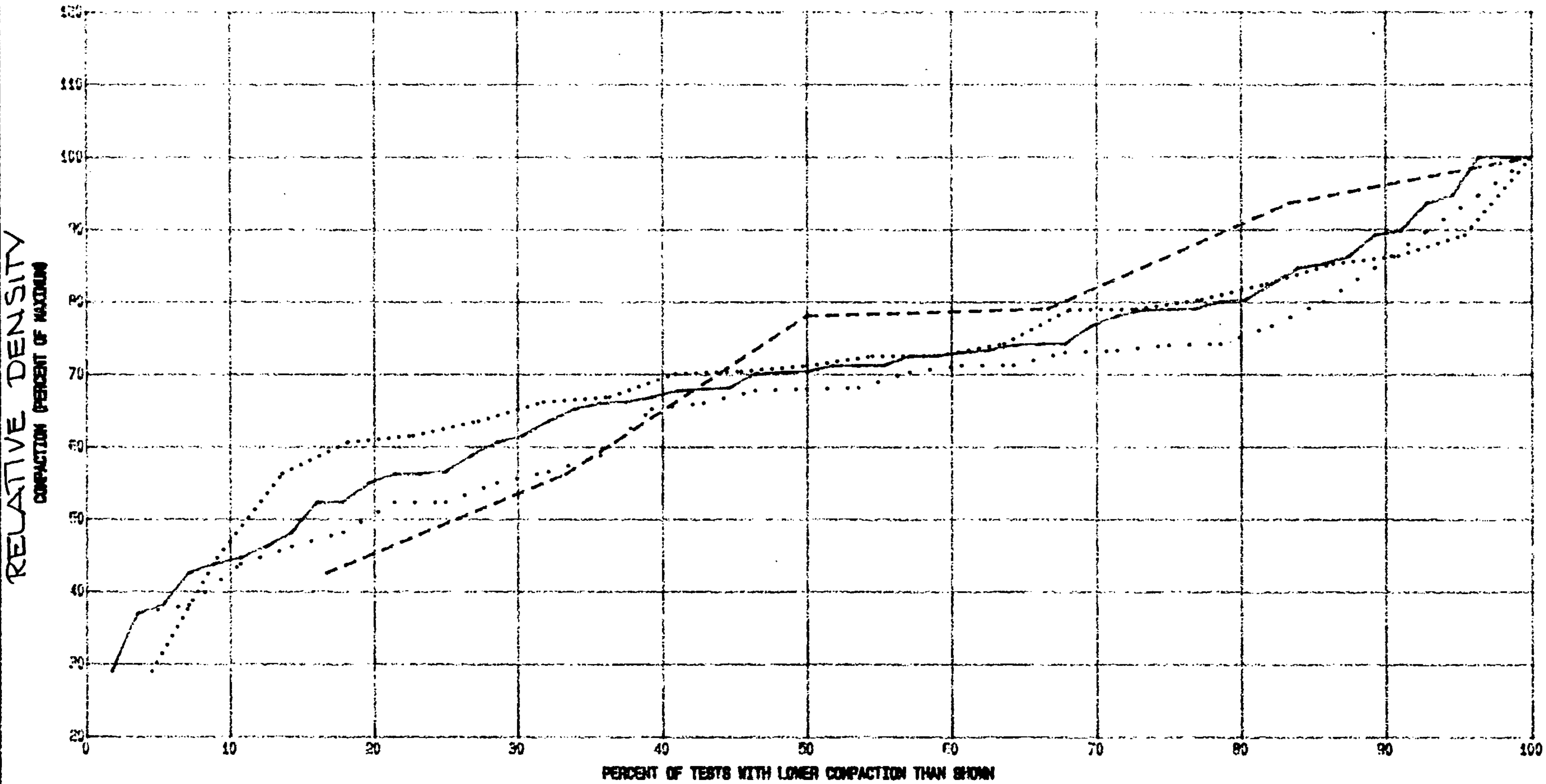
FINES - S-CURVE

Project LITTLE DELL DAM

Area TRANSITION I

Boring No.

Date



Line Style	From Date	To Date	# Points	Mean	Std Dev	10 %	Median	90 %
....	01-01-92	12-31-92	22	70.99432	18.34011	44.67123	70.43401	85.28548
. . . . . .	01-01-91	12-31-91	28	66.34392	16.06039	38.16461	67.76765	84.76094
– – – – – –	01-01-90	12-31-90	6	74.95343	21.9124	0	88.28069	93.67799
————	01-01-90	12-31-92	56	69.0933	16.41579	43.84967	70.29703	89.28014

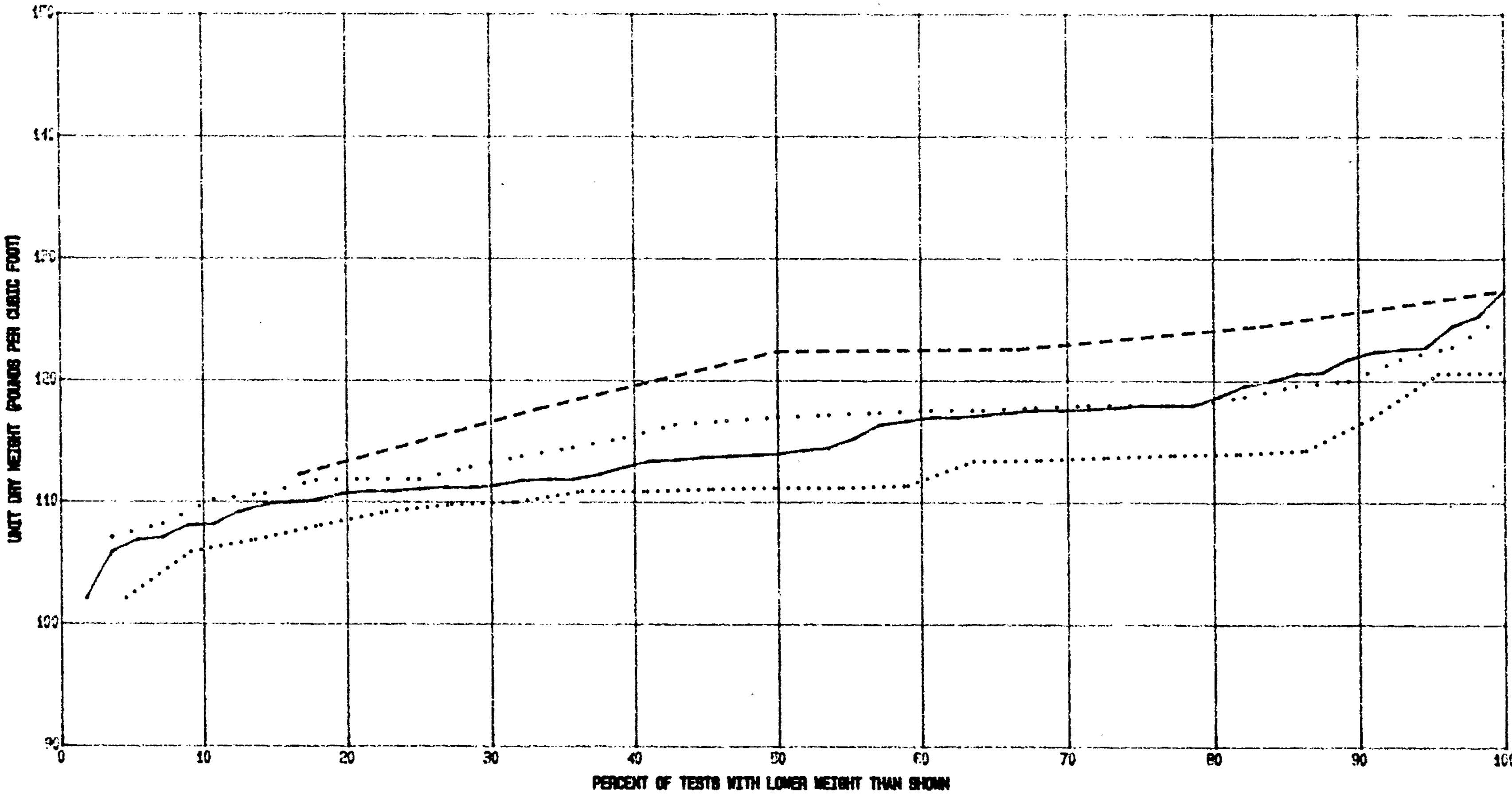
RELATIVE DENSITY / COMPACTION - S-CURVE

Project LITTLE DELL DAM

Area TRANSITION I

Boring No.

Date



Line Style	From Date	To Date	# Points	Mean	Std Dev	10 %	Median	90 %
··········	01-01-92	12-31-92	22	111.8091	4.319562	105.9	111.1	114.3
· · · · ·	01-01-91	12-31-91	28	116.0071	4.295738	108.2	116.7	120
– – – – –	01-01-90	12-31-90	6	121.15	5.368556	0	117.7	124.5
———	01-01-90	12-31-92	56	114.9089	5.246314	108.1	113.9	121.8

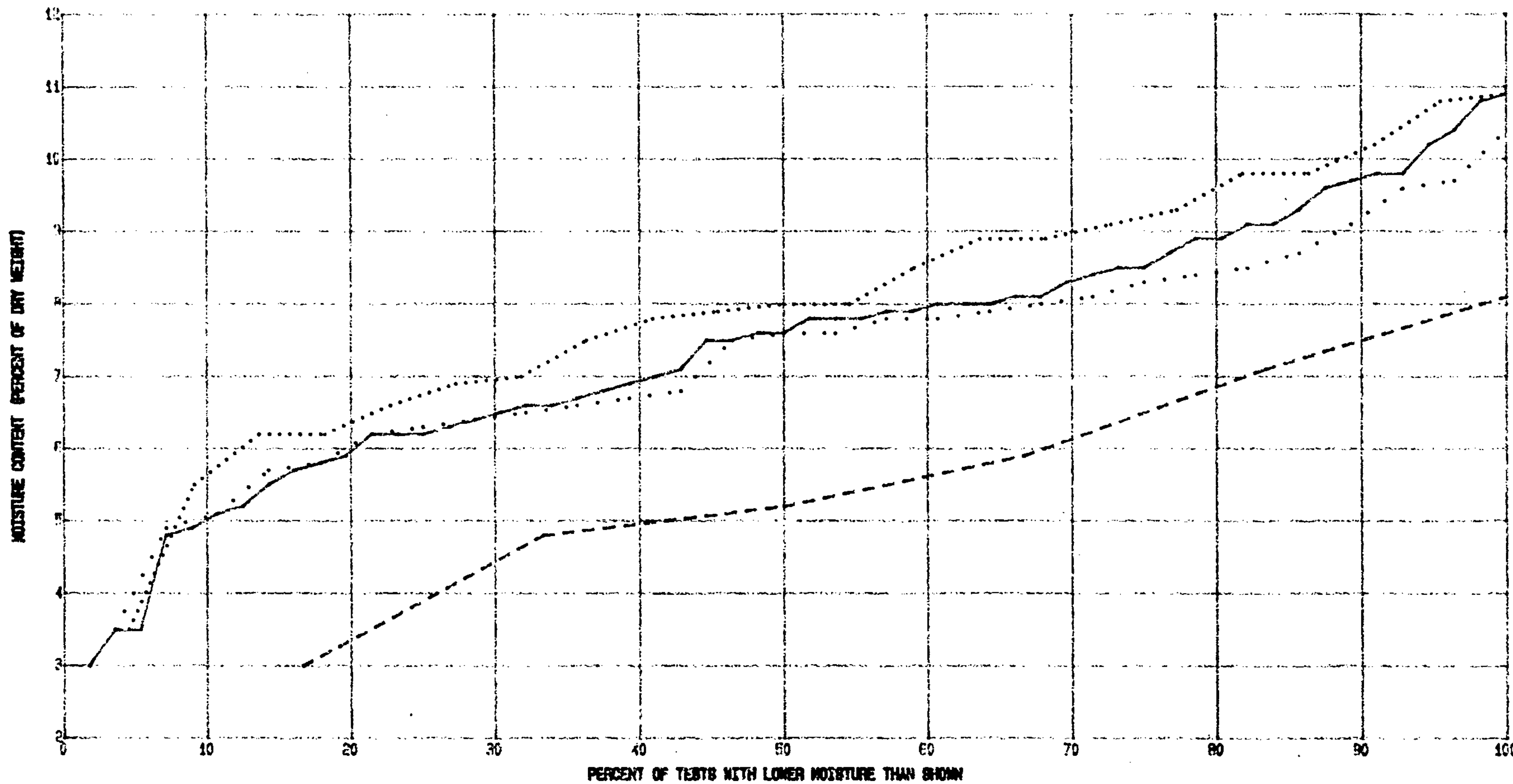
IN PLACE UNIT WEIGHT - S-CURVE

Project LITTLE DELL DAM

Area TRANSITION I

Boring No.

Date



Line Style	From Date	To Date	# Points	Mean	Std Dev	10 %	Median	90 %
....	01-01-92	12-31-92	22	8.059091	1.821998	5.5	7.9	9.8
. . . . . .	01-01-91	12-31-91	28	7.339286	1.566865	4.9	7.8	9.1
— — — —	01-01-90	12-31-90	6	5.683333	1.794901	0	4.8	7.1
————	01-01-90	12-31-92	56	7.444643	1.80574	4.9	7.8	9.7

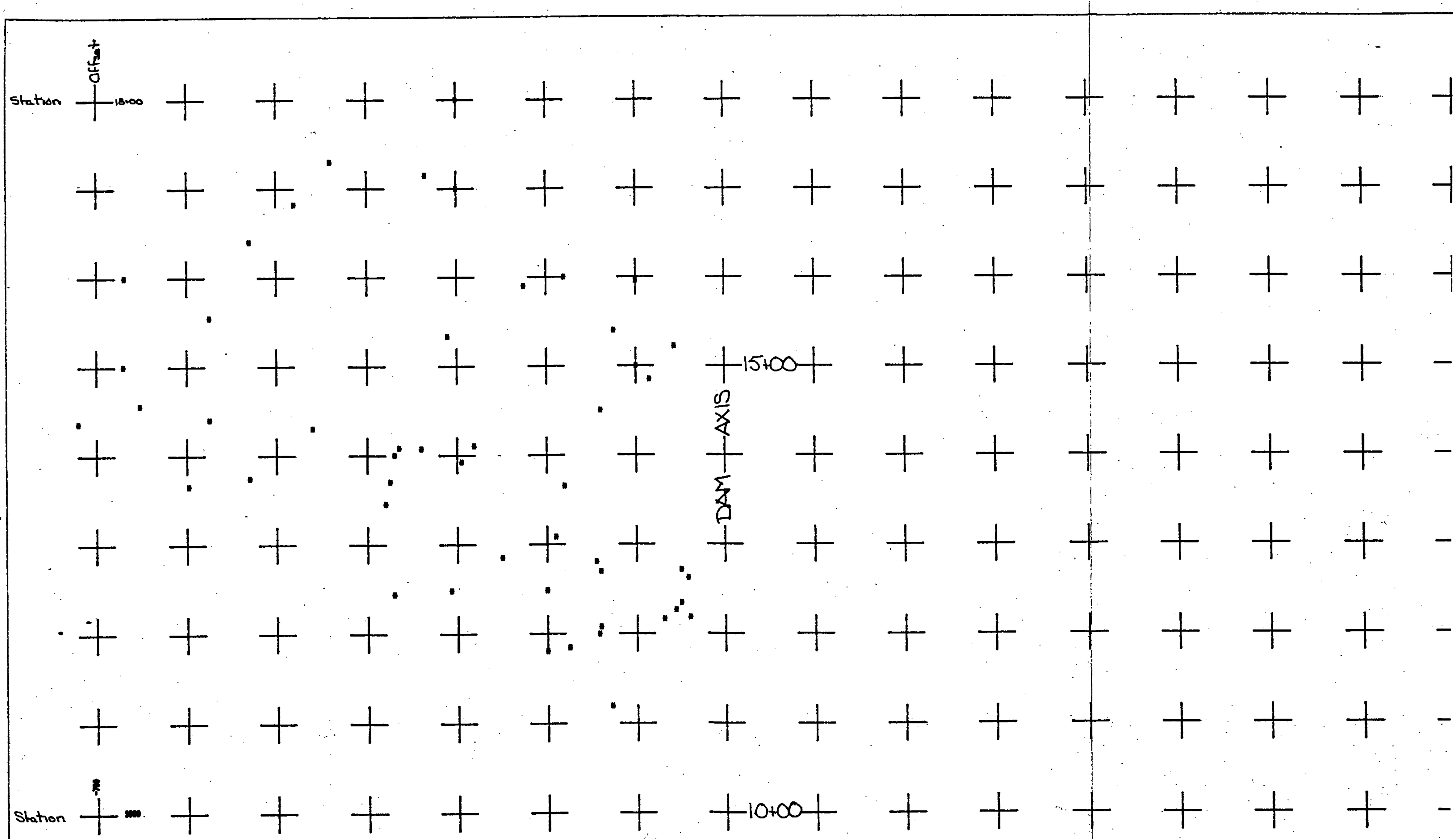
MOISTURE CONTENT - S-CURVE

Project LITTLE DELL DAM

Area TRANSITION I

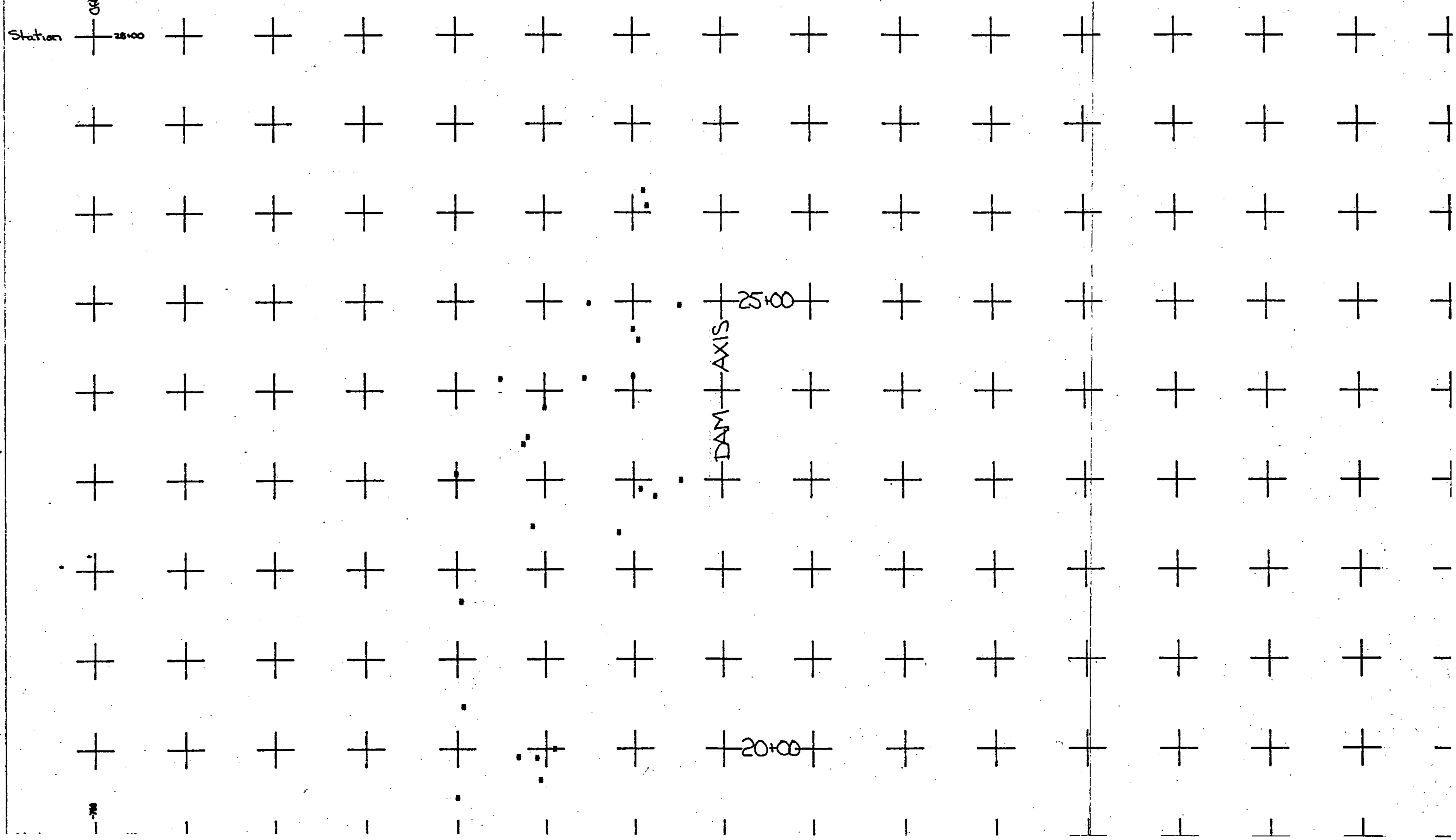
Boring No.

Date



TRANSITION I´ D/S SHELL TEST LOCATIONS

TRANSITION I D/S SHELL TEST LOCATIONS



APPENDIX II

FIELD CONTROL DATA, LITTLE DELL DAM

TRANSITION FILL II
DOWNSTREAM SHELL
and
CHIMNEY

Specifications Comparison Report

Gradations Report

Compaction Report

Comments Report

Gradation Curves

S Curves
- % Gravel
- % Sand
- % Fines
- % Relative Density
- Unit Weight
- Moisture Content

Test Locals

QUALITY ACCEPTANCE TESTING - SPECIFICATIONS COMPARISON REPORT REPORT NUMBER: TII.0

PROJECT: LITTLE DELL LAKE, DAM AND APPURTENANCES
RIVER: SALT LAKE CITY STREAMS
STATE: UTAH
TOWN: SALT LAKE CITY

CONTRACT NO. DACW05-89-C-0045

CONTRACTOR: CLEMENT BROTHERS AND J.E. STARNES CO.

DATE OF REPORT: 12-10-92

01-01-90 THRU 12-31-92

EMBANKMENT ZONE	MIN. RELATIVE DENS.	SPEC. W.C. % RANGE	LOOSE LIFT THICK. (IN)	NUMBER OF PASSES	COMPACTION EQUIPMENT
TRANSITION II	50	-	12	4	IR SD1500

TEST NUMBER	DATE	ELEV	LOCATION STATION	LOCATION OFFSET	% COBBL	% GRAV	% SAND	% FINES	% COMPACTION DESIGN >= 50%	MOISTURE IN SPEC %- %	GRADATION IN SPEC	GRAVELS IN SPEC > %	FINES IN SPEC < 15 %	TEST IN SPEC	STATUS FAILED TESTS
461	09-18-90	5574.7	1530	-40	0.0	1.0	95.0	4.0	-	-	Y	-	Y	Y	
483	09-25-90	5574.0	1555	-48	0.0	1.0	94.0	5.0	N	-	Y	-	Y	N	OLD
487	09-26-90	5578.5	1460	-49	0.0	.4	95.6	4.0	Y	-	Y	-	Y	Y	
491	09-28-90	5579.5	1425	-45	0.0	3.0	94.0	3.0	N	-	Y	-	Y	N	OLD
496	09-29-90	5578.0	1560	-43	0.0	3.0	93.0	4.0	Y	-	Y	-	Y	Y	
498	09-29-90	5580.0	1430	-44	0.0	1.0	95.0	4.0	Y	-	Y	-	Y	Y	
522	10-10-90	5582.5	1540	-39	0.0	3.0	94.0	3.0	Y	-	Y	-	Y	Y	
548	10-18-90	5586.1	1500	-37	0.0	2.0	94.0	4.0	Y	-	Y	-	Y	Y	
551	10-18-90	5587.5	1450	-40	0.0	6.0	89.0	5.0	Y	-	Y	-	Y	Y	
585	10-29-90	5586.6	1475	-42	0.0	1.0	95.0	4.0	Y	-	Y	-	Y	Y	
589	10-29-90	5584.0	1550	-90	0.0	2.0	93.0	5.0	Y	-	Y	-	Y	Y	
590	10-30-90	5587.0	1525	-42	0.0	1.0	95.0	4.0	Y	-	Y	-	Y	Y	
596	10-31-90	5585.0	1400	-99	0.0	5.0	91.0	4.0	Y	-	Y	-	Y	Y	
599	10-31-90	5588.0	1520	-43	0.0	6.0	91.0	3.0	Y	-	Y	-	Y	Y	
689A	06-08-91	5580.6	1640	-445	0.0	7.0	88.0	5.0	Y	-	Y	-	Y	Y	
697A	06-10-91	5574.6	1530	-378	0.0	2.0	92.9	5.1	Y	-	Y	-	Y	Y	
792	06-20-91	5585.0	1395	-150	0.0	0.0	96.1	3.9	Y	-	Y	-	Y	Y	
801	06-24-91	5576.4	1570	-600	0.0	0.0	95.5	4.5	Y	-	Y	-	Y	Y	
807	06-25-91	5570.0	1450	-525	0.0	0.0	95.4	4.6	N	-	Y	-	Y	N	OLD
810	06-25-91	5588.5	1400	-250	0.0	0.0	97.9	2.1	N	-	Y	-	Y	N	OLD
828	06-27-91	5569.5	1400	-650	0.0	1.0	95.2	3.8	Y	-	Y	-	Y	Y	
831	06-28-91	5575.1	1315	-600	0.0	1.0	95.5	3.5	Y	-	Y	-	Y	Y	
835	06-28-91	5586.3	1650	-525	0.0	0.0	96.5	3.5	Y	-	Y	-	Y	Y	
857	07-02-91	5587.0	1340	-475	0.0	0.0	95.9	4.1	Y	-	Y	-	Y	Y	
866	07-04-91	5566.1	1448	-650	0.0	0.0	94.4	5.6	Y	-	Y	-	Y	Y	
878	07-08-91	5592.8	1385	-150	0.0	0.0	96.6	3.4	Y	-	Y	-	Y	Y	
890	07-10-91	5590.8	1415	-50	0.0	1.0	97.8	1.2	Y	-	Y	-	Y	Y	
898	07-12-91	5591.8	1390	-35	0.0	.2	95.6	4.2	Y	-	Y	-	Y	Y	
908	07-15-91	5593.1	1500	-38	0.0	1.0	93.6	5.4	Y	-	Y	-	Y	Y	
916	07-16-91	5595.5	1700	-32	0.0	1.0	94.2	4.8	Y	-	Y	-	Y	Y	
922	07-17-91	5595.6	1400	-37	0.0	7.0	77.4	***15.6***	Y	-	N	-	N	N	
933	07-18-91	5600.6	1800	-60	0.0	0.0	95.2	4.8	Y	-	Y	-	Y	Y	
936	07-19-91	5601.1	1710	-40	0.0	11.0	83.1	5.9	Y	-	Y	-	Y	Y	
944	07-22-91	5680.1	1525	-38	0.0	0.0	95.7	4.3	Y	-	Y	-	Y	Y	
949	07-23-91	5601.0	1575	-37	0.0	0.0	96.0	4.0	Y	-	Y	-	Y	Y	
954	07-24-91	5607.0	1850	-35	0.0	.4	95.5	4.1	Y	-	Y	-	Y	Y	
955	07-24-91	5601.8	1500	-35	0.0	12.0	83.0	5.0	Y	-	Y	-	Y	Y	
958	07-24-91	5602.1	1515	-40	0.0	9.0	84.3	6.7	Y	-	Y	-	Y	Y	
964	07-25-91	5600.7	1372	-42	0.0	10.0	83.8	6.2	Y	-	Y	-	Y	Y	
970	07-26-91	5608.4	1875	-42	0.0	9.0	83.3	7.7	Y	-	Y	-	Y	Y	
972	07-26-91	5609.0	1700	-575	0.0	10.0	83.8	6.2	Y	-	Y	-	Y	Y	
979	07-27-91	5608.6	1565	-39	0.0	7.0	83.6	9.4	Y	-	Y	-	Y	Y	RW,RT
979A	07-29-91	5606.9	1565	-44	0.0	9.0	82.6	8.4	Y	-	Y	-	Y	Y	

TEST NUMBER	DATE	ELEV	LOCATION		% COBBL	% GRAV	% SAND	% FINES	% COMPACTION DESIGN >= 50%	MOISTURE IN SPEC %- %	GRADATION IN SPEC	GRAVELS IN SPEC > %	FINES IN SPEC < 15 %	TEST IN SPEC	STATUS FAILED TESTS
			STATION	OFFSET											
988	07-31-91	5608.0	1520	-35	0.0	6.0	89.4	4.6	Y	-	Y	-	Y	Y	
1008	08-02-91	5609.9	1380	-260	0.0	6.0	91.4	2.6	Y	-	Y	-	Y	Y	
1013	08-03-91	5614.0	1600	-42	0.0	7.0	89.1	3.9	Y	-	Y	-	Y	Y	
1008A	08-05-91	5609.8	1380	-265	0.0	4.0	91.4	4.6	Y	-	Y	-	Y	Y	
1025	08-06-91	5617.1	1850	-38	0.0	4.0	91.5	4.5	Y	-	Y	-	Y	Y	
1033	08-07-91	5622.2	1720	-375	0.0	5.0	91.8	3.2	Y	-	Y	-	Y	Y	
1037	08-07-91	5617.0	1950	-60	0.0	2.0	93.9	4.1	Y	-	Y	-	Y	Y	
1045	08-08-91	5618.8	1700	-38	0.0	7.0	88.7	4.3	Y	-	Y	-	Y	Y	
1051	08-08-91	5618.8	1565	-38	0.0	2.0	94.3	3.7	Y	-	Y	-	Y	Y	
1054	08-09-91	5619.0	1520	-37	0.0	5.0	89.8	5.2	Y	-	Y	-	Y	Y	
1055	08-09-91	5619.9	1500	-35	0.0	2.0	93.7	4.3	Y	-	Y	-	Y	Y	
1062	08-10-91	5622.7	1510	-38	0.0	2.0	94.6	3.4	Y	-	Y	-	Y	Y	
1065	08-10-91	5622.8	1700	-36	0.0	5.0	91.0	4.0	Y	-	Y	-	Y	Y	
1070	08-10-91	5622.7	1570	-38	0.0	3.0	94.2	2.8	Y	-	Y	-	Y	Y	
1073	08-12-91	5625.1	1400	-33	0.0	8.0	86.4	5.6	Y	-	Y	-	Y	Y	
1108	08-17-91	5631.5	1600	-36	0.0	4.0	91.6	4.4	Y	-	Y	-	Y	Y	
1134	08-21-91	5626.8	1965	-200	0.0	6.0	89.0	5.0	Y	-	Y	-	Y	Y	
1141	08-21-91	5637.2	1725	-37	0.0	6.0	90.0	4.0	Y	-	Y	-	Y	Y	
1149	08-22-91	5633.7	1400	-31	0.0	11.0	83.8	5.2	Y	-	Y	-	Y	Y	
1189	08-24-91	5632.3	1900	-30	0.0	9.0	85.5	5.5	Y	-	Y	-	Y	Y	
1246	08-31-91	5631.1	1525	-32	0.0	9.0	86.4	4.6	Y	-	Y	-	Y	Y	
1249	08-31-91	5632.7	2000	-185	0.0	12.0	82.5	5.5	Y	-	Y	-	Y	Y	
1269	09-04-91	5632.6	2060	-144	0.0	9.0	86.3	4.7	Y	-	Y	-	Y	Y	
1279	09-06-91	5643.0	1290	-250	0.0	14.0	80.2	5.8	Y	-	Y	-	Y	Y	
1281	09-06-91	5645.1	1550	-31	0.0	10.0	85.4	4.6	Y	-	Y	-	Y	Y	
1317	09-19-91	5646.2	2050	-210	0.0	15.0	79.5	5.5	Y	-	Y	-	Y	Y	
1320	09-20-91	5648.4	1550	-33	0.0	11.0	83.0	6.0	Y	-	Y	-	Y	Y	
1339	09-23-91	5652.6	1870	-27	0.0	11.0	83.5	5.5	Y	-	Y	-	Y	Y	
1344	09-24-91	5655.0	2145	-110	0.0	13.0	81.0	6.0	Y	-	Y	-	Y	Y	
1354	09-26-91	5655.0	1675	-29	0.0	14.0	81.4	4.6	Y	-	Y	-	Y	Y	
1377	10-01-91	5660.9	1955	-300	0.0	17.0	77.6	5.4	Y	-	N	-	Y	N	
1398	10-04-91	5660.9	2100	-294	0.0	14.0	79.3	6.7	N	-	Y	-	Y	N	OLD
1404	10-05-91	5658.8	1679	-28	0.0	16.0	79.4	4.6	-	-	Y	-	Y	Y	
1405	10-05-91	5659.8	1579	-28	0.0	15.0	80.2	4.8	Y	-	N	-	Y	N	
1408	10-06-91	5661.5	1540	-31	0.0	14.0	79.8	6.2	-	-	Y	-	Y	Y	
1410	10-06-91	5660.6	1280	-60	0.0	17.0	77.4	5.6	Y	-	Y	-	Y	Y	
1413	10-07-91	5661.9	1700	-29	0.0	13.0	81.4	5.6	-	-	Y	-	Y	Y	
1422	10-09-91	5662.6	1507	-29	0.0	16.0	78.0	6.0	Y	-	Y	-	Y	Y	
1450	10-10-91	5664.8	1877	-32	0.0	13.0	80.7	6.3	-	-	Y	-	Y	Y	
1459	10-11-91	5651.7	1264	-342	0.0	14.0	79.9	6.1	Y	-	Y	-	Y	Y	
1465	10-13-91	5666.5	1643	-27	0.0	16.0	78.6	5.4	-	-	Y	-	Y	Y	
1481	10-16-91	5661.4	1275	-224	0.0	18.0	76.1	5.9	Y	-	Y	-	Y	Y	
1488	10-18-91	5669.2	1544	-28	0.0	17.0	77.8	5.2	Y	-	Y	-	Y	Y	
1506	10-22-91	5669.7	2158	-286	0.0	11.0	82.5	6.5	Y	-	Y	-	Y	Y	
1604	04-11-92	5669.6	1470	-28	0.0	8.0	87.4	4.6	Y	-	Y	-	Y	Y	
1635	04-20-92	5673.6	2144	-28	0.0	1.0	94.2	4.8	-	-	Y	-	Y	Y	
1639	04-25-92	5673.6	2219	-28	0.0	10.0	85.1	4.9	Y	-	Y	-	Y	Y	
1683	05-02-92	5676.7	1422	-29	0.0	8.0	88.0	4.0	Y	-	Y	-	Y	Y	
1692	05-05-92	5682.0	2097	-28	0.0	8.0	87.6	4.4	Y	-	Y	-	Y	Y	
1705	05-11-92	5675.2	2216	-328	0.0	11.0	85.8	3.2	Y	-	Y	-	Y	Y	
1717	05-14-92	5681.6	1393	-27	0.0	7.0	88.5	4.5	Y	-	Y	-	Y	Y	
1747	05-26-92	5686.3	2261	-246	0.0	11.0	84.4	4.6	Y	-	Y	-	Y	Y	

QUALITY ACCEPTANCE TESTING - SPECIFICATIONS COMPARISON REPORT REPORT NUMBER: TII.0

TEST NUMBER	DATE	ELEV	LOCATION STATION	LOCATION OFFSET	% COBBL	% GRAV	% SAND	% FINES	% COMPACTION DESIGN >= 50%	MOISTURE IN SPEC %- %	GRADATION IN SPEC	GRAVELS IN SPEC > %	FINES IN SPEC < 15 %	TEST IN SPEC	STATUS FAILED TESTS
1753	05-27-92	5689.3	2104	-28	0.0	9.0	86.4	4.6	Y	-	Y	-	Y	Y	
1773	05-30-92	5688.9	1550	-28	0.0	11.0	84.1	4.9	Y	-	Y	-	Y	Y	
1788	06-02-92	5693.6	2334	-70	0.0	8.0	87.2	4.8	Y	-	Y	-	Y	Y	
1804	06-05-92	5691.4	1284	-26	0.0	10.0	85.5	4.5	Y	-	Y	-	Y	Y	
1832	06-10-92	5696.0	1244	-50	0.0	8.0	87.9	4.1	-	-	Y	-	Y	Y	
1845	06-12-92	5697.9	2279	-25	0.0	11.0	83.7	5.3	Y	-	Y	-	Y	Y	
1859	06-19-92	5700.4	2369	-27	0.0	11.0	84.1	4.9	Y	-	Y	-	Y	Y	
1875	06-23-92	5702.4	2050	-26	0.0	9.0	86.0	5.0	Y	-	Y	-	Y	Y	
1936	07-03-92	5708.7	1415	-28	0.0	2.0	94.2	3.8	Y	-	Y	-	Y	Y	
1993	07-17-92	5718.8	2135	-25	0.0	9.0	86.8	4.2	Y	-	Y	-	Y	Y	
2028	07-22-92	5725.1	1847	-23	0.0	9.0	87.8	3.2	N	-	Y	-	Y	N	OLD
2054	07-28-92	5724.1	2518	-22	0.0	10.0	86.0	4.0	Y	-	Y	-	Y	Y	
2091	08-02-92	5731.3	1334	-35	0.0	13.0	83.5	3.5	Y	-	Y	-	Y	Y	
2105	08-04-92	5728.1	2457	-147	0.0	11.0	85.1	3.9	Y	-	Y	-	Y	Y	
2114	08-05-92	5735.4	2050	-25	0.0	9.0	87.3	3.7	Y	-	Y	-	Y	Y	
2160	08-13-92	5742.7	1750	-23	0.0	9.0	86.8	4.2	Y	-	Y	-	Y	Y	
2170	08-14-92	5738.9	2488	-150	0.0	10.0	85.9	4.1	Y	-	Y	-	Y	Y	
2191	08-18-92	5748.9	1450	-24	0.0	14.0	82.2	3.8	Y	-	Y	-	Y	Y	
2194	08-18-92	5747.4	2580	-20	0.0	12.0	84.2	3.8	Y	-	Y	-	Y	Y	
2195	08-18-92	5747.4	2575	-29	0.0	11.0	84.5	4.5	Y	-	Y	-	Y	Y	
2212	08-22-92	5751.8	2311	-22	0.0	11.0	84.7	4.3	Y	-	Y	-	Y	Y	
2236	08-27-92	5757.0	1350	-22	0.0	0.0	97.4	2.6	-	-	Y	-	Y	Y	
2237	08-27-92	5757.0	2300	-22	0.0	0.0	97.0	3.0	-	-	Y	-	Y	Y	
2244	08-28-92	5762.5	1128	-130	0.0	11.0	84.6	4.4	Y	-	Y	-	Y	Y	
2248	08-28-92	5758.0	2433	-18	0.0	0.0	95.7	4.3	N	-	Y	-	Y	N	OLD
2248A	08-30-92	5757.8	2438	-18	0.0	0.0	95.7	4.3	Y	-	Y	-	Y	Y	
2264	09-02-92	5761.9	1226	-20	0.0	11.0	83.8	5.2	Y	-	Y	-	Y	Y	
2289	09-10-92	5766.1	2490	-22	0.0	11.0	85.1	3.9	Y	-	Y	-	Y	Y	
2323	09-16-92	5780.3	2138	-20	0.0	11.0	80.6	8.4	Y	-	Y	-	Y	Y	
2352	09-22-92	5790.7	2252	-20	0.0	13.0	81.2	5.8	Y	-	Y	-	Y	Y	
2363	09-25-92	5795.5	2411	-17	0.0	8.0	83.2	8.8	Y	-	Y	-	Y	Y	
2367	09-25-92	5793.3	1138	-20	0.0	7.0	84.7	8.3	Y	-	Y	-	Y	Y	

NOTE: These statistics include only results of tests that are NOT designated as RM, RW, or RW,RT.

	% COMPACTION DESIGN	MOISTURE IN SPEC	GRADATION IN SPEC	GRAVELS IN SPEC	FINES IN SPEC	TEST IN SPEC
FAILING TEST LOCATIONS	7	0	3	0	1	10
PASSING TEST LOCATIONS	109	0	123	0	125	116
TOTAL TEST LOCATIONS	116	0	126	0	126	126
% FAILING TEST LOCATIONS	6.0	0.0	2.4	0.0	0.8	7.9

REMARKS LEGEND

RM - Test Location Removed
RW - Test Loc. Reworked and NOT Retested
RW,RT - Test Loc. Reworked and Retested
AR - Additional Rolling at Test Location

TEST LOCATIONS REWORKED - UNTESTED..	0
TEST LOCATIONS REWORKED - RETESTED..	1
TEST LOCATIONS REMOVED.............	0
FAILED TEST LOCATIONS NOT REWORKED OR RETESTED..	10
PERCENT OF FAILED TEST LOCATIONS NOT REWORKED OR RETESTED IN PERMANENT FILL..	7.9

COMMENT: THIS REPORT COVERS THE ENTIRE CONSTRUCTION OF THE DAM.

LAB CHIEF: ____________________ SUBMITTED BY: ____________________
PROJECT ENGINEER

QUALITY ACCEPTANCE TESTING - GRADATIONS REPORT — REPORT NUMBER: TII.1 —

PROJECT: LITTLE DELL LAKE, DAM AND APPURTENANCES
RIVER: SALT LAKE CITY STREAMS
STATE: UTAH
TOWN: SALT LAKE CITY

CONTRACT NO. DACW05-89-C-0045

CONTRACTOR: CLEMENT BROTHERS AND J.E. STARNES CO.

DATE OF REPORT: 12-10-92

01-01-90 THRU 12-31-92

EMBANKMENT ZONE	MIN. RELATIVE DENS.	SPEC. W.C. % RANGE	LOOSE LIFT THICK. (IN)	NUMBER OF PASSES	COMPACTION EQUIPMENT
TRANSITION II	50		12	4	IR SD150D

TEST NUMBER	DATE	ELEV	LOCATION		GRADATION - PERCENT PASSING									LL	PI	CLASSIFICATION
			STATION	OFFSET	1.5IN	3/4IN	3/8IN	# 4	# 10	# 20	# 40	#100	#200			
461	09-18-90	5574.7	1530	-40	100.0	100.0	100.0	99.0	76.0	56.0	45.0	14.0	4.0			SP
483	09-25-90	5574.0	1555	-48	100.0	100.0	100.0	99.0	78.0	56.0	45.0	15.0	5.0			SP-SC/SM
487	09-26-90	5578.5	1460	-49	100.0	100.0	100.0	99.6	78.0	54.0	44.0	13.0	4.0			SP
491	09-28-90	5579.5	1425	-45	100.0	100.0	100.0	97.0	73.0	52.0	41.0	10.0	3.0			SP
496	09-29-90	5578.0	1560	-43	100.0	100.0	100.0	97.0	73.0	53.0	43.0	13.0	4.0			SP
498	09-29-90	5580.0	1430	-44	100.0	100.0	100.0	99.0	73.0	49.0	38.0	11.0	4.0			SP
522	10-10-90	5582.5	1540	-39	100.0	100.0	100.0	97.0	68.0	47.0	37.0	11.0	3.0			SP
548	10-18-90	5586.1	1500	-37	100.0	100.0	100.0	98.0	73.0	54.0	45.0	13.0	4.0			SP
551	10-18-90	5587.5	1450	-40	100.0	100.0	100.0	94.0	70.0	52.0	43.0	14.0	5.0			SP-SC/SM
585	10-29-90	5586.6	1475	-42	100.0	100.0	100.0	99.0	77.0	58.0	48.0	15.0	4.0			SP
589	10-29-90	5584.0	1550	-90	100.0	100.0	100.0	98.0	76.0	56.0	47.0	15.0	5.0			SP-SC/SM
590	10-30-90	5587.0	1525	-42	100.0	100.0	100.0	99.0	80.0	61.0	51.0	16.0	4.0			SP
596	10-31-90	5585.0	1400	-99	100.0	100.0	100.0	95.0	69.0	50.0	40.0	13.0	4.0			SP
599	10-31-90	5588.0	1520	-43	100.0	100.0	100.0	94.0	66.0	47.0	38.0	12.0	3.0			SP
689A	06-08-91	5580.6	1640	-445	100.0	100.0	100.0	93.0	65.0	47.0	38.0	14.0	5.0			SP-SC/SM
697A	06-10-91	5574.6	1530	-378	100.0	100.0	100.0	98.0	71.0	49.0	37.0	13.0	5.1			SP-SC/SM
792	06-20-91	5585.0	1395	-150	100.0	100.0	100.0	100.0	66.0	45.0	35.0	10.0	3.9			SP
801	06-24-91	5576.4	1570	-600	100.0	100.0	100.0	100.0	67.0	45.0	35.0	11.0	4.5			SP
807	06-25-91	5570.0	1450	-525	100.0	100.0	100.0	100.0	71.0	51.0	41.0	11.0	4.6			SP
810	06-25-91	5588.5	1400	-250	100.0	100.0	100.0	100.0	62.0	39.0	30.0	7.0	2.1			SP
828	06-27-91	5569.5	1400	-650	100.0	100.0	100.0	99.0	70.0	50.0	40.0	11.0	3.8			SP
831	06-28-91	5575.1	1315	-600	100.0	100.0	100.0	99.0	71.0	50.0	39.0	11.0	3.5			SP
835	06-28-91	5586.3	1650	-525	100.0	100.0	100.0	100.0	68.0	46.0	36.0	10.0	3.5			SP
857	07-02-91	5587.0	1340	-475	100.0	100.0	100.0	100.0	73.0	52.0	40.0	10.0	4.1			SP
866	07-04-91	5566.1	1448	-650	100.0	100.0	100.0	100.0	72.0	52.0	42.0	13.0	5.6			SP-SC/SM
878	07-08-91	5592.8	1385	-150	100.0	100.0	100.0	100.0	71.0	50.0	40.0	9.0	3.4			SP
890	07-10-91	5590.8	1415	-50	100.0	100.0	100.0	99.0	68.0	43.0	33.0	7.0	1.2			SP
898	07-12-91	5591.8	1390	-35	100.0	100.0	100.0	99.8	73.0	55.0	44.0	12.0	4.2			SP
908	07-15-91	5593.1	1500	-38	100.0	100.0	100.0	99.0	72.0	51.0	40.0	13.0	5.4			SP-SC/SM
916	07-16-91	5595.5	1700	-32	100.0	100.0	100.0	99.0	73.0	54.0	43.0	11.0	4.8			SP
922	07-17-91	5595.6	1400	-37	100.0	100.0	100.0	93.0	73.0	62.0	**56.0**	24.0	**15.6**			SC/SM
933	07-18-91	5600.6	1800	-60	100.0	100.0	100.0	100.0	67.0	46.0	36.0	11.0	4.8			SP
936	07-19-91	5601.1	1710	-40	100.0	100.0	100.0	89.0	62.0	47.0	40.0	16.0	5.9			SP-SC/SM
944	07-22-91	5600.1	1525	-38	100.0	100.0	100.0	100.0	74.0	53.0	41.0	12.0	4.3			SP
949	07-23-91	5601.0	1575	-37	100.0	100.0	100.0	100.0	63.0	40.0	30.0	10.0	4.0			SP
954	07-24-91	5607.0	1850	-35	100.0	100.0	100.0	99.6	67.0	45.0	35.0	11.0	4.1			SP
955	07-24-91	5601.8	1500	-35	100.0	100.0	100.0	88.0	61.0	46.0	38.0	15.0	5.0			SP-SC/SM
958	07-24-91	5602.1	1515	-40	100.0	100.0	100.0	91.0	67.0	53.0	45.0	18.0	6.7			SP-SC/SM
964	07-25-91	5600.7	1372	-42	100.0	100.0	100.0	90.0	66.0	53.0	46.0	17.0	6.2			SP-SC/SM
970	07-26-91	5608.4	1875	-42	100.0	100.0	100.0	91.0	61.0	44.0	36.0	17.0	7.7			SP-SC/SM
972	07-26-91	5609.0	1700	-575	100.0	100.0	100.0	90.0	62.0	48.0	41.0	17.0	6.2			SP-SC/SM
979	07-27-91	5608.6	1565	-39	100.0	100.0	100.0	93.0	67.0	52.0	43.0	21.0	9.4			SP-SC/SM
979A	07-29-91	5606.9	1565	-44	100.0	100.0	100.0	91.0	60.0	43.0	35.0	18.0	8.4			SP-SC/SM

QUALITY ACCEPTANCE TESTING - GRADATIONS REPORT REPORT NUMBER: TII.1

TEST NUMBER	DATE	ELEV	LOCATION STATION	OFFSET	GRADATION - PERCENT PASSING 1.5IN	3/4IN	3/8IN	# 4	# 10	# 20	# 40	#100	#200		LL	PI	CLASSIFICATION
988	07-31-91	5608.0	1520	-35	100.0	100.0	100.0	94.0	66.0	49.0	40.0	15.0	4.6				SP
1008	08-02-91	5609.9	1380	-260	100.0	100.0	100.0	94.0	66.0	47.0	32.0	9.0	2.6				SP
1013	08-03-91	5614.0	1600	-42	100.0	100.0	100.0	93.0	66.0	49.0	36.0	11.0	3.9				SP
1008A	08-05-91	5609.8	1380	-265	100.0	100.0	100.0	96.0	69.0	52.0	38.0	13.0	4.6				SP
1025	08-06-91	5617.1	1850	-38	100.0	100.0	100.0	96.0	75.0	58.0	37.0	13.0	4.5				SP
1033	08-07-91	5622.2	1720	-375	100.0	100.0	100.0	95.0	80.0	63.0	38.0	10.0	3.2				SP
1037	08-07-91	5617.0	1950	-60	100.0	100.0	100.0	98.0	70.0	50.0	31.0	12.0	4.1				SP
1045	08-08-91	5618.8	1700	-38	100.0	100.0	100.0	93.0	76.0	59.0	35.0	11.0	4.3				SP
1051	08-08-91	5618.8	1565	-38	100.0	100.0	100.0	98.0	76.0	58.0	37.0	13.0	3.7				SP
1054	08-09-91	5619.0	1520	-37	100.0	100.0	100.0	95.0	73.0	56.0	36.0	14.0	5.2				SP-SC/SM
1055	08-09-91	5619.9	1500	-35	100.0	100.0	100.0	98.0	74.0	57.0	36.0	13.0	4.3				SP
1062	08-10-91	5622.7	1510	-38	100.0	100.0	100.0	98.0	71.0	53.0	32.0	12.0	3.4				SP
1065	08-10-91	5622.8	1700	-36	100.0	100.0	100.0	95.0	72.0	55.0	37.0	12.0	4.0				SP
1070	08-10-91	5622.7	1570	-38	100.0	100.0	100.0	97.0	63.0	44.0	27.0	10.0	2.8				SP
1073	08-12-91	5625.1	1400	-33	100.0	100.0	100.0	92.0	70.0	54.0	37.0	13.0	5.6				SP-SC/SM
1108	08-17-91	5631.5	1600	-36	100.0	100.0	100.0	96.0	72.0	56.0	34.0	13.0	4.4				SP
1134	08-21-91	5626.8	1965	-200	100.0	100.0	100.0	94.0	79.0	64.0	44.0	14.0	5.0				SP-SC/SM
1141	08-21-91	5637.2	1725	-37	100.0	100.0	100.0	94.0	76.0	61.0	39.0	12.0	4.0				SP
1149	08-22-91	5633.7	1400	-31	100.0	100.0	100.0	89.0	68.0	53.0	39.0	14.0	5.2				SP-SC/SM
1189	08-24-91	5632.3	1900	-30	100.0	100.0	99.0	91.0	73.0	60.0	42.0	14.0	5.5				SP-SC/SM
1246	08-31-91	5631.1	1525	-32	100.0	100.0	100.0	91.0	68.0	52.0	36.0	12.0	4.6				SP
1249	08-31-91	5632.7	2000	-185	100.0	100.0	100.0	88.0	70.0	55.0	40.0	14.0	5.5				SP-SC/SM
1269	09-04-91	5632.6	2060	-144	100.0	100.0	100.0	91.0	69.0	53.0	37.0	14.0	4.7				SP
1279	09-06-91	5643.0	1290	-250	100.0	100.0	98.0	86.0	68.0	53.0	38.0	14.0	5.8				SP-SC/SM
1281	09-06-91	5645.1	1550	-31	100.0	100.0	100.0	90.0	69.0	53.0	38.0	12.0	4.6				SP
1317	09-19-91	5646.2	2050	-210	100.0	100.0	99.0	85.0	68.0	55.0	40.0	15.0	5.5				SP-SC/SM
1320	09-20-91	5648.4	1550	-33	100.0	100.0	99.0	89.0	71.0	56.0	40.0	15.0	6.0				SP-SC/SM
1339	09-23-91	5652.6	1870	-27	100.0	100.0	100.0	89.0	67.0	53.0	37.0	13.0	5.5				SP-SC/SM
1344	09-24-91	5655.0	2145	-110	100.0	100.0	99.0	87.0	67.0	53.0	39.0	14.0	6.0				SP-SC/SM
1354	09-26-91	5655.0	1675	-29	100.0	100.0	99.0	86.0	62.0	48.0	35.0	11.5	4.6				SP
1377	10-01-91	5660.9	1955	-300	100.0	100.0	99.0	83.0	55.0	***32.0***	***18.0***	6.0	5.4				SP-SC/SM
1398	10-04-91	5660.9	2100	-294	100.0	100.0	99.0	86.0	63.0	51.0	40.0	15.0	6.7				SP-SC/SM
1404	10-05-91	5658.8	1679	-28	100.0	100.0	100.0	84.0	60.0	47.0	37.0	12.0	4.6				SP
1405	10-05-91	5659.8	1579	-28	100.0	100.0	100.0	85.0	***54.0***	40.0	31.0	12.0	4.8				SP
1408	10-06-91	5661.5	1540	-31	100.0	100.0	100.0	86.0	62.0	49.0	37.0	15.0	6.2				SP-SC/SM
1410	10-06-91	5660.6	1280	-60	100.0	100.0	99.0	83.0	58.0	45.0	34.0	13.0	5.6				SP-SC/SM
1413	10-07-91	5661.9	1700	-29	100.0	100.0	100.0	87.0	60.0	46.0	35.0	13.0	5.6				SP-SC/SM
1422	10-09-91	5662.6	1507	-29	100.0	100.0	99.0	84.0	60.0	46.0	35.0	13.0	6.0				SP-SC/SM
1450	10-10-91	5664.8	1877	-32	100.0	100.0	100.0	87.0	66.0	52.0	38.0	15.0	6.3				SP-SC/SM
1459	10-11-91	5651.7	1264	-342	100.0	100.0	99.0	86.0	65.0	51.0	38.0	14.0	6.1				SP-SC/SM
1465	10-13-91	5666.5	1643	-27	100.0	100.0	100.0	84.0	57.0	44.0	34.0	13.0	5.4				SP-SC/SM
1481	10-16-91	5661.4	1275	-224	100.0	100.0	98.0	82.0	55.0	42.0	33.0	14.0	5.9				SP-SC/SM
1488	10-18-91	5669.2	1544	-28	100.0	100.0	100.0	83.0	56.0	44.0	34.0	14.0	5.2				SP-SC/SM
1506	10-22-91	5669.7	2158	-286	100.0	100.0	100.0	89.0	62.0	48.0	35.0	15.0	6.5				SP-SC/SM
1604	04-11-92	5669.6	1470	-28	100.0	100.0	100.0	92.0	66.0	51.0	39.0	12.0	4.6				SP
1635	04-20-92	5673.6	2144	-28	100.0	100.0	100.0	99.0	76.0	55.0	35.0	14.0	4.8				SP
1639	04-25-92	5673.6	2219	-28	100.0	100.0	99.0	90.0	69.0	55.0	44.0	14.0	4.9				SP
1683	05-02-92	5676.7	1422	-29	100.0	100.0	100.0	92.0	68.0	51.0	40.0	13.0	4.0				SP
1692	05-05-92	5682.0	2097	-28	100.0	100.0	100.0	92.0	68.0	52.0	41.0	13.0	4.4				SP
1705	05-11-92	5675.2	2216	-328	100.0	100.0	99.0	89.0	63.0	47.0	36.0	11.0	3.2				SP
1717	05-14-92	5681.6	1393	-27	100.0	100.0	100.0	93.0	65.0	48.0	37.0	12.0	4.5				SP
1747	05-26-92	5686.3	2261	-246	100.0	100.0	100.0	89.0	65.0	51.0	40.0	14.0	4.6				SP

QUALITY ACCEPTANCE TESTING - GRADATIONS REPORT　　REPORT NUMBER: TII.1　　

TEST NUMBER	DATE	ELEV	LOCATION		GRADATION - PERCENT PASSING										LL	PI	CLASSIFICATION
			STATION	OFFSET	1.5IN	3/4IN	3/8IN	# 4	# 10	# 20	# 40	#100	#200				
1753	05-27-92	5689.3	2104	-28	100.0	98.0	98.0	91.0	70.0	52.0	36.0	11.0	4.6				SP
1773	05-30-92	5688.9	1550	-28	100.0	100.0	98.0	89.0	66.0	51.0	37.0	14.0	4.9				SP
1788	06-02-92	5693.6	2334	-70	100.0	100.0	99.0	92.0	69.0	54.0	41.0	15.0	4.8				SP
1804	06-05-92	5691.4	1284	-26	100.0	100.0	99.0	90.0	62.0	46.0	35.0	11.0	4.5				SP
1832	06-10-92	5696.0	1244	-50	100.0	100.0	99.0	92.0	64.0	46.0	33.0	10.0	4.1				SP
1845	06-12-92	5697.9	2279	-25	100.0	100.0	100.0	89.0	62.0	46.0	34.0	12.0	5.3				SP-SC/SM
1859	06-19-92	5700.4	2369	-27	100.0	100.0	100.0	89.0	56.0	41.0	29.0	11.0	4.9				SP
1875	06-23-92	5702.4	2050	-26	100.0	100.0	100.0	91.0	62.0	46.0	34.0	12.0	5.0				SP-SC/SM
1936	07-03-92	5708.7	1415	-28	100.0	100.0	99.0	98.0	60.0	43.0	32.0	10.0	3.8				SP
1993	07-17-92	5718.8	2135	-25	100.0	100.0	100.0	91.0	62.0	45.0	35.0	11.0	4.2				SP
2028	07-22-92	5725.1	1847	-23	100.0	100.0	100.0	91.0	57.0	39.0	30.0	9.0	3.2				SP
2054	07-28-92	5724.1	2518	-22	100.0	100.0	100.0	90.0	60.0	43.0	33.0	10.0	4.0				SP
2091	08-02-92	5731.3	1334	-35	100.0	100.0	99.0	87.0	62.0	45.0	34.0	11.0	3.5				SP
2105	08-04-92	5728.1	2457	-147	100.0	100.0	100.0	89.0	63.0	45.0	34.0	11.0	3.9				SP
2114	08-05-92	5735.4	2050	-25	100.0	100.0	100.0	91.0	62.0	44.0	33.0	10.0	3.7				SP
2160	08-13-92	5742.7	1750	-23	100.0	100.0	100.0	91.0	63.0	49.0	34.0	11.0	4.2				SP
2170	08-14-92	5738.9	2488	-150	100.0	100.0	99.0	90.0	65.0	50.0	39.0	12.0	4.1				SP
2191	08-18-92	5748.9	1450	-24	100.0	100.0	100.0	86.0	62.0	49.0	38.0	12.0	3.8				SP
2194	08-18-92	5747.4	2580	-20	100.0	100.0	100.0	88.0	61.0	46.0	36.0	12.0	3.8				SP
2195	08-18-92	5747.4	2575	-29	100.0	100.0	100.0	89.0	65.0	51.0	40.0	14.0	4.5				SP
2212	08-22-92	5751.8	2311	-22	100.0	100.0	99.5	89.0	57.0	40.0	30.0	11.0	4.3				SP
2236	08-27-92	5757.0	1350	-22	100.0	100.0	100.0	100.0	75.0	39.0	25.0	11.0	2.6				SP
2237	08-27-92	5757.0	2300	-22	100.0	100.0	100.0	100.0	78.0	44.0	29.0	11.0	3.0				SP
2244	08-28-92	5762.5	1128	-130	100.0	100.0	100.0	89.0	61.0	45.0	35.0	12.0	4.4				SP
2248	08-28-92	5758.0	2433	-18	100.0	100.0	100.0	100.0	79.0	44.0	29.0	13.0	4.3				SP
2248A	08-30-92	5757.8	2438	-18	100.0	100.0	100.0	100.0	79.0	44.0	29.0	13.0	4.3				SP
2264	09-02-92	5761.9	1226	-20	100.0	100.0	100.0	89.0	60.0	44.0	33.0	12.0	5.2				SP-SM/SC
2289	09-10-92	5766.1	2490	-22	100.0	100.0	100.0	89.0	67.0	52.0	41.0	13.0	3.9				SP
2323	09-16-92	5780.3	2138	-20	100.0	100.0	100.0	89.0	68.0	46.0	35.0	15.0	8.4				SP-SM/SC
2352	09-22-92	5790.7	2252	-20	100.0	100.0	100.0	87.0	61.0	46.0	35.0	13.0	5.8				SP-SM/SC
2363	09-25-92	5795.5	2411	-17	100.0	100.0	100.0	92.0	69.0	50.0	39.0	16.0	8.8				SP-SM/SC
2367	09-25-92	5793.3	1138	-20	100.0	100.0	100.0	93.0	69.0	50.0	40.0	15.0	8.3				SP-SM/SC

NOTE - Emphasized Numbers indicate percent passing outside of gradation range specified.

COMMENT: THIS REPORT COVERS THE ENTIRE CONSTRUCTION OF THE DAM.

LAB CHIEF: ____________________　　SUBMITTED BY: ____________________

PROJECT ENGINEER

PROJECT: LITTLE DELL LAKE, DAM AND APPURTENANCES RIVER: SALT LAKE CITY STREAMS STATE: UTAH TOWN: SALT LAKE CITY	CONTRACT NO. DACW05-89-C-0045 CONTRACTOR: CLEMENT BROTHERS AND J.E. STARNES CO.	DATE OF REPORT: 12-10-92 01-01-90 THRU 12-31-92

EMBANKMENT ZONE	MIN. RELATIVE DENS.	SPEC. W.C. % RANGE	LOOSE LIFT THICK. (IN)	NUMBER OF PASSES	COMPACTION EQUIPMENT
TRANSITION II	50		12	4	IR SD150D

TEST NUMBER	DATE	ELEV	LOCATION STATION	LOCATION OFFSET	FIELD DRY DENS (PCF)	FIELD MC %	STANDARD LAB COMPACTION TEST METH	STANDARD LAB COMPACTION MX DRY DEN	STANDARD LAB COMPACTION MN DRY DEN	RELATIVE DENSITY	PERCENT +- OMC	CLASSIFICATION
461	09-18-90	5574.7	1530	-40			RD/461	120.8	104.5			SP
483	09-25-90	5574.0	1555	-48	111.3	4.0	RD/483	122.6	107.0	***30.4***		SP-SC/SM
487	09-26-90	5578.5	1460	-49	113.3	8.1	RD/487	119.5	102.2	67.7		SP
491	09-28-90	5579.5	1425	-45	114.2	5.5	RD/491	123.6	106.4	***49.1***		SP
496	09-29-90	5578.0	1560	-43	118.3	5.1	RD/496	123.8	104.4	75.0		SP
498	09-29-90	5580.0	1430	-44	118.5	5.6	H/497	127.9	106.0	61.6		SP
522	10-10-90	5582.5	1540	-39	117.9	9.2	RD/522	118.5	104.0	96.3		SP
548	10-18-90	5586.1	1500	-37	119.9	7.4	RD/548	123.1	103.7	85.7		SP
551	10-18-90	5587.5	1450	-40	117.9	7.7	RD/551	124.4	105.0	70.2		SP-SC/SM
585	10-29-90	5586.6	1475	-42	115.0	7.9	RD/585	120.3	100.3	76.9		SP
589	10-29-90	5584.0	1550	-90	113.0	6.5	RD/589	121.0	99.7	66.9		SP-SC/SM
590	10-30-90	5587.0	1525	-42	111.8	5.7	RD/590	116.4	102.6	69.4		SP
596	10-31-90	5585.0	1400	-99	119.1	6.5	RD/596	123.0	103.1	83.0		SP
599	10-31-90	5588.0	1520	-43	117.8	6.1	RD/599	124.1	105.6	69.5		SP
689A	06-08-91	5580.6	1640	-445	127.4	8.5	H/661	128.5	100.7	96.9		SP-SC/SM
697A	06-10-91	5574.6	1530	-378	117.0	10.4	H/697	123.6	96.2	80.2		SP-SC/SM
792	06-20-91	5585.0	1395	-150	118.4	5.0	RD/792	125.3	105.2	69.5		SP
801	06-24-91	5576.4	1570	-600	124.9	7.5	RD/801	124.2	106.4	100.0		SP
807	06-25-91	5570.0	1450	-525	112.3	10.6	RD/807	129.3	105.7	***32.2***		SP
810	06-25-91	5588.5	1400	-250	115.9	7.0	RD/810	129.3	105.7	***48.2***		SP
828	06-27-91	5569.5	1400	-650	117.3	8.6	RD/828	120.8	105.9	78.8		SP
831	06-28-91	5575.1	1315	-600	114.9	5.4	RD/831	125.7	105.7	50.3		SP
835	06-28-91	5586.3	1650	-525	119.0	5.3	RD/835	127.6	105.3	65.9		SP
857	07-02-91	5587.0	1340	-475	119.8	7.2	RD/857	124.2	106.0	78.6		SP
866	07-04-91	5566.1	1448	-650	117.3	3.9	RD/866	127.5	105.0	59.4		SP-SC/SM
878	07-08-91	5592.8	1385	-150	113.3	3.6	RD/878	120.4	105.2	56.6		SP
890	07-10-91	5590.8	1415	-50	118.7	6.2	RD/890	124.4	105.7	72.9		SP
898	07-12-91	5591.8	1390	-35	115.2	9.0	RD/898	124.4	102.5	62.6		SP
908	07-15-91	5593.1	1500	-38	121.3	7.3	RD/908	122.3	104.6	95.1		SP-SC/SM
916	07-16-91	5595.5	1700	-32	116.5	4.1	RD/916	120.9	104.1	76.6		SP
922	07-17-91	5595.6	1400	-37	119.3	6.5	RD/922	124.4	105.3	76.4		SC/SM
933	07-18-91	5600.6	1800	-60	122.8	5.6	RD/933	121.5	106.7	100.0		SP
936	07-19-91	5601.1	1710	-40	125.3	9.6	RD/936	132.0	103.7	80.4		SP-SC/SM
944	07-22-91	5600.1	1525	-38	121.2	8.2	RD/944	120.8	105.5	100.0		SP
949	07-23-91	5601.0	1575	-37	124.8	8.0	RD/949	126.8	106.9	91.4		SP
954	07-24-91	5607.0	1850	-35	124.5	5.8	RD/954	127.6	106.5	87.4		SP
955	07-24-91	5601.8	1500	-35	123.6	9.7	H/954	127.6	106.5	83.7		SP-SC/SM
958	07-24-91	5602.1	1515	-40	126.1	12.0	RD/958	129.9	102.3	88.8		SP-SC/SM
964	07-25-91	5600.7	1372	-42	123.9	10.7	RD/964	126.8	105.3	88.5		SP-SC/SM
970	07-26-91	5608.4	1875	-42	123.1	9.2	RD/970	133.3	101.7	73.3		SP-SC/SM
972	07-26-91	5609.0	1700	-575	119.7	9.9	RD/972	130.3	104.3	64.5		SP-SC/SM
979	07-27-91	5608.6	1565	-39	138.0	11.8	RD/979	134.9	104.4	100.0		SP-SC/SM
979A	07-29-91	5606.9	1565	-44	128.8	9.0	H/979	134.9	104.4	83.8		SP-SC/SM

TEST NUMBER	DATE	ELEV	LOCATION STATION	LOCATION OFFSET	FIELD DRY DENS (PCF)	FIELD MC %	STANDARD LAB COMPACTION TEST METH	STANDARD LAB COMPACTION MX DRY DEN	STANDARD LAB COMPACTION MN DRY DEN	RELATIVE DENSITY	PERCENT +- OMC	CLASSIFICATION
988	07-31-91	5608.0	1520	-35	121.7	7.6	RD/988	122.3	104.2	97.2		SP
1008	08-02-91	5609.9	1380	-260	111.4	10.4	RD/1008	123.7	99.7	54.1		SP
1013	08-03-91	5614.0	1600	-42	121.2	11.3	RD/1013	124.7	103.8	85.7		SP
1008A	08-05-91	5609.8	1380	-265	119.6	12.0	RD/1008A	122.2	102.8	88.5		SP
1025	08-06-91	5617.1	1850	-38	114.1	13.3	RD/1025	120.4	100.3	72.4		SP
1033	08-07-91	5622.2	1720	-375	110.1	11.3	RD/1033	116.5	99.8	65.3		SP
1037	08-07-91	5617.0	1950	-60	115.2	7.1	RD/1037	122.1	96.9	77.0		SP
1045	08-08-91	5618.8	1700	-38	113.1	10.7	RD/1045	122.3	100.4	62.7		SP
1051	08-08-91	5618.8	1565	-38	111.4	5.5	RD/1051	119.5	97.9	67.0		SP
1054	08-09-91	5619.0	1520	-37	119.2	11.6	RD/1054	123.9	101.9	81.7		SP-SC/SM
1055	08-09-91	5619.9	1500	-35	116.8	8.4	RD/1055	120.8	97.7	85.5		SP
1062	08-10-91	5622.7	1510	-38	112.4	5.9	RD/1062	121.7	103.3	53.5		SP
1065	08-10-91	5622.8	1700	-36	116.1	10.2	RD/1065	119.3	102.9	82.7		SP
1070	08-10-91	5622.7	1570	-38	115.1	5.7	RD/1070	120.8	102.7	71.9		SP
1073	08-12-91	5625.1	1400	-33	120.6	10.8	RD/1073	126.5	103.4	78.1		SP-SC/SM
1108	08-17-91	5631.5	1600	-36	116.8	8.6	RD/1108	123.6	99.9	75.5		SP
1134	08-21-91	5626.8	1965	-200	118.1	11.5	RD/1134	121.7	99.7	86.2		SP-SC/SM
1141	08-21-91	5637.2	1725	-37	109.3	11.8	RD/1141	121.3	99.2	50.7		SP
1149	08-22-91	5633.7	1400	-31	117.2	9.5	RD/1149	127.8	106.4	55.0		SP-SC/SM
1189	08-24-91	5632.3	1900	-30	118.6	8.6	RD/1189	121.3	101.0	88.7		SP-SC/SM
1246	08-31-91	5631.1	1525	-32	113.6	8.4	RD/1246	119.0	100.3	74.5		SP
1249	08-31-91	5632.7	2000	-185	114.9	11.7	RD/1249	124.9	102.2	60.8		SP-SC/SM
1269	09-04-91	5632.6	2060	-144	115.3	9.3	RD/1269	125.0	102.6	61.5		SP
1279	09-06-91	5643.0	1290	-250	118.8	9.6	RD/1279	129.5	101.9	66.7		SP-SC/SM
1281	09-06-91	5645.1	1550	-31	118.1	5.5	RD/1281	124.8	97.1	80.1		SP
1317	09-19-91	5646.2	2050	-210	116.3	12.2	RD/1317	122.8	101.9	72.8		SP-SC/SM
1320	09-20-91	5648.4	1550	-33	119.9	9.6	RD/1320	124.1	104.9	80.9		SP-SC/SM
1339	09-23-91	5652.6	1870	-27	115.3	10.1	RD/1339	126.4	99.2	64.9		SP-SC/SM
1344	09-24-91	5655.0	2145	-110	119.0	10.5	RD/1344	129.5	100.4	69.6		SP-SC/SM
1354	09-26-91	5655.0	1675	-29	115.2	7.8	RD/1354	122.4	101.7	69.3		SP
1377	10-01-91	5660.9	1955	-300	121.8	8.1	RD/1377	130.0	102.2	75.3		SP-SC/SM
1398	10-04-91	5660.9	2100	-294	115.5	10.1	RD/1398	130.7	103.7	***49.5***		SP-SC/SM
1404	10-05-91	5658.8	1679	-28								SP
1405	10-05-91	5659.8	1579	-28	126.4	8.7	RD/1405	129.5	102.3	90.8		SP
1408	10-06-91	5661.5	1540	-31								SP-SC/SM
1410	10-06-91	5660.6	1280	-60	123.5	10.7	RD/1410	128.9	103.1	82.5		SP-SC/SM
1413	10-07-91	5661.9	1700	-29								SP-SC/SM
1422	10-09-91	5662.6	1507	-29	121.2	10.6	RD/1422	130.0	103.1	72.2		SP-SC/SM
1450	10-10-91	5664.8	1877	-32								SP-SC/SM
1459	10-11-91	5651.7	1264	-342	124.8	8.5	RD/1459	129.1	102.7	86.6		SP-SC/SM
1465	10-13-91	5666.5	1643	-27								SP-SC/SM
1481	10-16-91	5661.4	1275	-224	123.0	9.0	RD/1481	132.1	101.2	75.8		SP-SC/SM
1488	10-18-91	5669.2	1544	-28	117.6	8.0	RD/1488	132.1	102.4	57.5		SP-SC/SM
1506	10-22-91	5669.7	2158	-286	121.7	11.3	RD/1506	130.1	102.4	74.5		SP-SC/SM
1604	04-11-92	5669.6	1470	-28	115.2	13.2	RD/1604	125.2	98.8	67.5		SP
1635	04-20-92	5673.6	2144	-28								SP
1639	04-25-92	5673.6	2219	-28	115.8	10.1	RD/1639	118.0	90.8	93.7		SP
1683	05-02-92	5676.7	1422	-29	110.9	11.0	RD/1683	117.8	99.8	65.5		SP
1692	05-05-92	5682.0	2097	-28	111.5	10.4	RD/1692	117.8	96.0	75.1		SP
1705	05-11-92	5675.2	2216	-328	115.1	10.3	RD/1705	118.2	101.2	84.0		SP
1717	05-14-92	5681.6	1393	-27	113.9	10.0	RD/1717	125.7	100.5	58.7		SP
1747	05-26-92	5686.3	2261	-246	114.0	11.6	RD/1747	118.4	97.8	81.7		SP

QUALITY ACCEPTANCE TESTING - COMPACTION REPORT REPORT NUMBER: TII.2

TEST NUMBER	DATE	ELEV	LOCATION		FIELD DRY DENS (PCF)	MC %	STANDARD LAB COMPACTION			RELATIVE DENSITY	PERCENT +- OMC	CLASSIFICATION
			STATION	OFFSET			TEST METH	MX DRY DEN	MN DRY DEN			
1753	05-27-92	5689.3	2104	-28	118.3	11.2	RD/1753	119.1	95.4	97.3		SP
1773	05-30-92	5688.9	1550	-28	115.5	7.3	RD/1773	119.4	98.5	84.1		SP
1788	06-02-92	5693.6	2334	-70	110.2	8.4	RD/1788	119.8	101.2	52.6		SP
1804	06-05-92	5691.4	1284	-26	116.7	9.8	RD/1804	117.0	99.7	98.5		SP
1832	06-10-92	5696.0	1244	-50								SP
1845	06-12-92	5697.9	2279	-25	119.1	7.7	RD/1845	123.4	102.1	82.7		SP-SC/SM
1859	06-19-92	5700.4	2369	-27	112.7	8.3	RD/1859	126.1	101.2	51.7		SP
1875	06-23-92	5702.4	2050	-26	112.8	11.7	RD/1875	123.4	98.4	63.0		SP-SC/SM
1936	07-03-92	5708.7	1415	-28	115.0	8.7	RD/1936	122.8	102.0	66.7		SP
1993	07-17-92	5718.8	2135	-25	113.3	11.2	RD/1993	123.6	100.5	60.4		SP
2028	07-22-92	5725.1	1847	-23	112.2	8.8	RD/2028	129.4	105.3	**33.0**		SP
2054	07-28-92	5724.1	2518	-22	121.0	6.7	RD/2054	126.0	102.6	81.9		SP
2091	08-02-92	5731.3	1334	-35	120.0	8.9	RD/2091	125.7	104.5	76.6		SP
2105	08-04-92	5728.1	2457	-147	115.7	6.0	RD/2105	125.1	103.9	60.2		SP
2114	08-05-92	5735.4	2050	-25	119.2	7.0	RD/2114	123.3	101.4	84.1		SP
2160	08-13-92	5742.7	1750	-23	117.9	8.0	RD/2160	128.9	99.8	68.0		SP
2170	08-14-92	5738.9	2488	-150	113.4	10.5	RD/2170	123.9	101.7	57.6		SP
2191	08-18-92	5748.9	1450	-24	117.3	9.1	RD/2191	120.8	100.7	85.1		SP
2194	08-18-92	5747.4	2580	-20	121.7	9.6	RD/2194	122.6	100.1	96.7		SP
2195	08-18-92	5747.4	2575	-29	124.3	10.6	H/2194	122.6	100.1	100.0		SP
2212	08-22-92	5751.8	2311	-22	123.0	9.4	RD/2212	127.3	100.0	87.2		SP
2236	08-27-92	5757.0	1350	-22								SP
2237	08-27-92	5757.0	2300	-22								SP
2244	08-28-92	5762.5	1128	-130	115.5	8.8	RD/2244	120.0	101.3	78.9		SP
2248	08-28-92	5758.0	2433	-18	102.0	6.6	RD/2248	120.0	97.5	**23.5**		SP
2248A	08-30-92	5757.8	2438	-18	112.9	6.7	H/2248	120.0	97.5	72.7		SP
2264	09-02-92	5761.9	1226	-20	122.6	8.0	RD/2264	129.6	99.9	80.8		SP-SM/SC
2289	09-10-92	5766.1	2490	-22	116.6	9.1	RD/2289	116.6	100.4	100.0		SP
2323	09-16-92	5780.3	2138	-20	125.9	3.1	RD/2323	129.7	106.9	85.8		SP-SM/SC
2352	09-22-92	5790.7	2252	-20	124.7	5.3	RD/2352	129.0	99.7	88.3		SP-SM/SC
2363	09-25-92	5795.5	2411	-17	123.5	5.3	RD/2363	120.6	102.0	100.0		SP-SM/SC
2367	09-25-92	5793.3	1138	-20	116.6	5.0	RD/2367	130.1	104.2	53.4		SP-SM/SC

TEST NUMBER	DATE	ELEV	LOCATION		FIELD		STANDARD LAB COMPACTION			RELATIVE DENSITY	PERCENT +- OMC	CLASSIFICATION
			STATION	OFFSET	DRY DENS (PCF)	MC %	TEST METH	MX DRY DEN	MN DRY DEN			

NOTE: Explanation of Column Headed TEST METH - 5/110 6

This indicates lab comparison type

All mold diameters are 12 inch unless noted here.

5 - 5 point proctor
1 or 2 - 1 or 2 point proctor
H - historical proctor
rd - relative density

proctor number used for comparison to field data

IN-PLACE - TEST RANGES FOR TESTS IN EMBANKMENT FOR THIS REPORT

FIELD DRY DENSITY	MIN	102.0	FIELD M.C.	MIN	3.1
FIELD DRY DENSITY	MAX	128.8	FIELD M.C.	MAX	13.3
FIELD DRY DENSITY	AVG	117.7	FIELD M.C.	AVG	8.5

AVGERAGE PERCENT COMPACTION THIS REPORT 74.0

AVERAGE PERCENT COMPACTION TO 12-31-92 74.2

COMMENT: THIS REPORT COVERS THE ENTIRE CONSTRUCTION OF THE DAM.

LAB CHIEF: ____________________

SUBMITTED BY: ____________________
PROJECT ENGINEER

Note: Average % Compaction = Average Relative Density

PROJECT: LITTLE DELL LAKE, DAM AND APPURTENANCES RIVER: SALT LAKE CITY STREAMS STATE: UTAH TOWN: SALT LAKE CITY	CONTRACT NO. DACW05-89-C-0045 CONTRACTOR: CLEMENT BROTHERS AND J.E. STARNES CO.	DATE OF REPORT: 12-10-92 01-01-90 THRU 12-31-92

EMBANKMENT ZONE	MIN. RELATIVE DENS.	SPEC. W.C. % RANGE	LOOSE LIFT THICK. (IN)	NUMBER OF PASSES	COMPACTION EQUIPMENT
TRANSITION II	50		12	4	IR SD150D

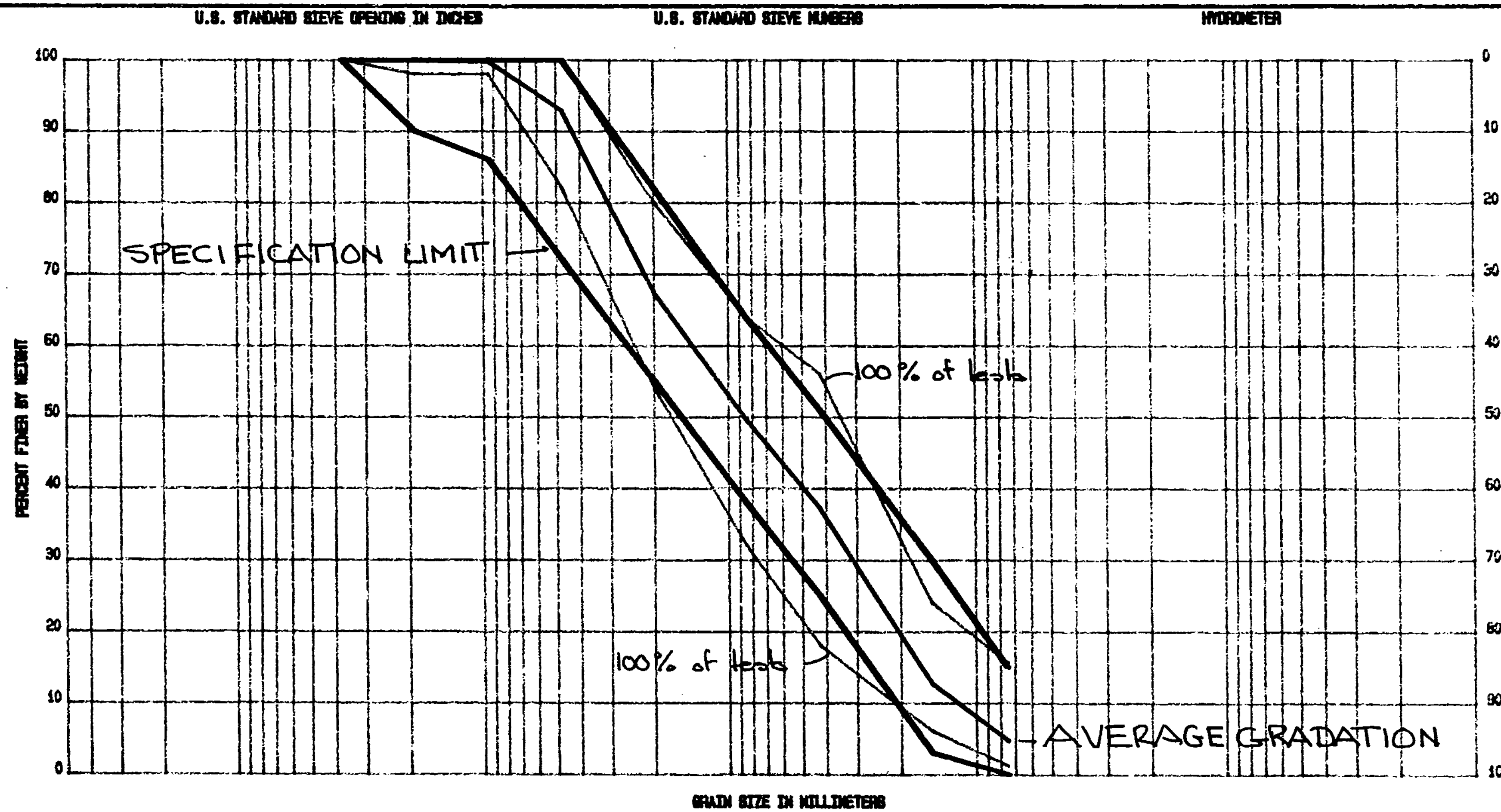
TEST NUMBER	TEST IN SPEC	STATUS FAILED TESTS	TEST COMMENTS
461	Y		SOURCE-CRUSHER. GRADATION & MAX.MIN.DENSITY. FIRST PLACEMENT OF TRANSITION IN THE CHIMNEY DRAIN.
483	N	OLD	SOURCE-CRUSHER. DENSITY & MAX.MIN. CHIMNEY BOTTOM WEDGE.
487	Y		SOURCE-CRUSHER. DENSITY & MAX.MIN. CHIMNEY AND BOTTOM WEDGE.
491	N	OLD	SOURCE-CRUSHER. DENSITY & MAX.MIN. CHIMNEY.
496	Y		SOURCE-CRUSHER. DENSITY & MAX.MIN. FIRST DENSITY TAKEN -6 INCHES BELOW GRADE. CHIMNEY.
498	Y		SOURCE-CRUSHER. DENSITY & MAX.MIN. CHIMNEY.
522	Y		SOURCE-CRUSHER. DENSITY & MAX.MIN. CHIMNEY.
548	Y		SOURCE-HARPERS. DENSITY & MAX.MIN. CHIMNEY.
551	Y		SOURCE-HARPERS. DENSITY & MAX.MIN.
585	Y		SOURCE-CRUSHER/HARPERS. GRADATION & DENSITY. CHIMNEY DRAIN.
589	Y		SOURCE-CRUSHER/HARPERS. GRADATION & DENSITY. BLANKET DRAIN
590	Y		SOURCE-CRUSHER/HARPERS. GRADATION & DENSITY. CHIMNEY DRAIN
596	Y		SOURCE-CRUSHER/HARPERS. GRADATION & DENSITY. BLANKET DRAIN
599	Y		SOURCE-CRUSHER/HARPERS. DENSITY & GRADATION. CHIMNEY DRAIN
689A	Y		SOURCE-CRUSHER/HARPERS. DENS.GRAD.REL.DENS. RETEST.
697A	Y		SOURCE-CRUSHER/HARPERS. DENS.GRAD.
792	Y		SOURCE-HARPERS PRODUCT. DENS.GRAD.REL.DENS.,LEFT ABUTMENT.
801	Y		SOURCE-HARPERS PRODUCT. DENS. GRAD.REL.DENS.,BLANKET DRAIN
807	N	OLD	SOURCE-HARPERS PRODUCT. DENS.GRAD.REL.DENS. BLANKET DRAIN TEST AT THE SUFACE,SHOULD HAVE BEEN BELOW SURFACE.
810	N	OLD	SOURCE-HARPERS PRODUCT. DENS.GRAD.REL.DENS., LEFT ABUTMENT
828	Y		SOURCE-HARPERS PRODUCT. DENS.GRAD.REL.DENS.,BLANKET DRAIN.
831	Y		SOURCE-HARPERS PRODUCT. DENS.GRAD.REL.DENS. LEFT ABUTMENT
835	Y		SOURCE-HARPERS PRODUCT. DENS.GRAD.REL.DENS. RIGHT ABUTMENT.
857	Y		SOURCE-HARPERS PRODUCT. DENS.GRAD.REL.DENS. LEFT ABUTMENT
866	Y		SOURCE-HARPERS PRODUCT. DENS.GRAD.REL.DENS. BLANKET D/S.
878	Y		SOURCE-HARPERS PRODUCT. DENS.GRAD.REL.DENS. LEFT ABUTMENT DENS.&MC IS AVERAGE OF THREE ADJACENT TESTS SEE 878B&C
890	Y		SOURCE-HARPERS PRODUCT. DENS.GRAD.REL.DENS. CHIMNEY
898	Y		SOURCE-HARPERS PRODUCT. DENS.GRAD.REL.DENS. CHIMNEY.
908	Y		SOURCE-HARPERS PRODUCT. DENS.GRAD.REL.DENS. CHIMNEY.
916	Y		SOURCE-HARPERS PRODUCT. DENS.GRAD.REL.DENS. CHIMNEY.IR 150D.
922	N		SOURCE-HARPERS PRODUCT. DENS.GRAD.REL.DENS. CHIMNEY.
933	Y		SOURCE- NOT STATED. DENS.GRAD.REL.DENS. CHIMNEY. IR150D.
936	Y		SOURCE-CRUSHER/HARPERS. DENS.GRAD.REL.DENS. CHIMNEY.
944	Y		SOURCE-NOT SPECIFIC. DENS.GRAD.REL.DENS. CHIMNEY.IR150D.
949	Y		SOURCE-NOT SPECIFIC. DENS.GRAD.REL.DENS. CHIMNEY. IR150D.
954	Y		SOURCE-NOT SPECIFIC. DENS.GRAD.REL.DENS. IR150D.
955	Y		SOURCE-NOT SPECIFIC. DENS.GRAD. IR150D.
958	Y		SOURCE-CRUSHER/HARPERS. DENS.GRAD.REL.DENS. CHIMNEY.IR150D.
964	Y		SOURCE-CRUSHER/HARPERS. DENS.GRAD.REL.DENS.&PROCTOR. MAX.DRY DENSITY 119.9, OMC 10.0. IR150D.
970	Y		SOURCE-CRUSHER/HARPERS. DENS.GRAD.REL.DENS. CHIMNEY.IR150D
972	Y		SOURCE-CRUSHER/HARPERS. DENS.GRAD.REL.DENS. RIGHT ABUTMENT IR150D.
979	Y	RW,RT	SOURCE-NOT SPECIFIC. DENS.GRAD.REL.DENS. REWORKED,SEE 979A. PORTIONS OF THE LIFT LIQUIFIED DURING ROLLING.
979A	Y		SOURCE-CRUSHER/HARPERS. DENS.GRAD.PROCTOR. IR150D

TEST NUMBER	TEST IN SPEC	STATUS FAILED TESTS	TEST COMMENTS
988	Y		SOURCE-CRUSHER/HARPERS&HARPERS MIX. DENS.GRAD.REL.DENS.CHIMNEY.
1008	Y		SOURCE-CRUSHER/HARPERS. DENS.GRAD.PROCTOR. IR150D.LEFT ABUTMENT. FIELD DENSITY IN ERROR, LIFT REWORKED,RETESTED.
1013	Y		SOURCE-CRUSHER/HARPERS. DENS.GRAD.REL.DENS. CHIMNEY.IR150D
1008A	Y		SOURCE-CRUSHER/HARPERS. DENS.GRAD.REL.DENS. LEFT ABUTMENT RETEST.
1025	Y		SOURCE-CRUSHER/COUNTY. DENS.GRAD.REL.DENS. IR150.CHIMNEY.
1033	Y		SOURCE-CRUSHER/COUNTY PIT. DENS.GRAD.REL.DENS. IR150.RIGHT ABUTMENT.
1037	Y		SOURCE-RIDGEPOINT. DENS.GRAD.REL.DENS. CHIMNEY FILLET. FIRST TIME PLACEMENT OF RIDGEPOINT SAND.
1045	Y		SOURCE-RIDGEPOINT. DENS.GRAD.REL.DENS. IR150
1051	Y		SOURCE-RIDGEPOINT. DENS.GRAD.REL.DENS. IR150 CHIMNEY
1054	Y		SOURCE-CRUSHER/HARPERS. DENS.GRAD.REL.DENS. IR150.
1055	Y		SOURCE-CRUSHER/RIDGEPOINT. DENS.GRAD.REL.DENS. CHIMNEY.IR150
1062	Y		SOURCE-NOT STATED. DENS.GRAD.REL.DENS. CHIMNEY. IR150
1065	Y		SOURCE-RIDGEPOINT. DENS.GRAD.REL.DENS. CHIMNEY. IR150.
1070	Y		SOURCE-RIDGEPOINT. DENS.GRAD.REL.DENS. CHIMNEY. IR150.
1073	Y		SOURCE-RIDGEPOINT. DENS.GRAD.REL.DENS. CHIMNEY. IR150
1108	Y		SOURCE-RIDGEPOINT. DENS.GRAD.REL.DENS. CHIMNEY. IR150D.
1134	Y		SOURCE-RIDGE POINT. DENS.GRAD.REL.DENS. RIGHT ABUTMENT. IR150D.
1141	Y		SOURCE-NOT STATED. DENS.GRAD.REL.DENS. CHIMNEY. IR150.
1149	Y		SOURCE-NOT SPECIFIC. DENS.GRAD.REL.DENS. CHIMNEY. IR150
1189	Y		SOURCE-NOT SPECIFIC. DENS.GRAD.REL.DENS. CHIMNEY. IR150
1246	Y		SOURCE-RIDGEPOINT. DENS.GRAD.REL.DENS. CHIMNEY. IR150.
1249	Y		SOURCE-NOT STATED. DENS.GRAD.REL.DENS. ABUTMENT. IR150
1269	Y		SOURCE-NOT STATED. DENS.GRAD.REL.DENS. IR150.
1279	Y		SOURCE-NOT SPECIFIC. DENS.GRAD.REL.DENS. LEFT ABUTMENT.IR150.
1281	Y		SOURCE-NOT SPECIFIC. DENS.GRAD.REL.DENS. CHIMNEY. IR150.
1317	Y		SOURCE-NOT STATED. DENS.GRAD.REL.DENS. RIGHT ABUTMENT.
1320	Y		SOURCE-NOT STATED. DENS.GRAD.REL.DENS. CHIMNEY.
1339	Y		SOURCE-NOT SPECIFIC. DENS.GRAD.REL.DENS. CHIMNEY.
1344	Y		SOURCE-NOT SPECIFIC. DENS.GRAD.REL.DENS. RIGHT ABUTMENT.IR150
1354	Y		SOURCE-NOT SPECIFIC. DENS.GRAD.REL.DENS. CHIMNEY. IR150
1377	N		SOURCE-NOT SPECIFIC. DENS.GRAD.REL.DENS. RIGHT ABUTMENT.
1398	N	OLD	SOURCE-NOT SPECIFIC. DENS.GRAD.REL.DENS. RIGHT ABUTMENT.
1404	Y		SOURCE-NOT SPECIFIC. GRADATION ONLY. TEST OF SUSPECT MATERIAL, SEE ALSO 1405. CHIMNEY.
1405	N		SOURCE-NOT SPECIFIC. DENS.GRAD.REL.DENS. TEST OF SUSPECT MATERIAL.SEE ALSO 1404. CHIMNEY.
1408	Y		SOURCE-NOT SPECIFIC. GRADATION ONLY. TEST OF SUSPECT MATERIAL. SEE ALSO 1409,1410,1411. CHIMNEY.
1410	Y		SOURCE-NOT SPECIFIC. DENS.GRAD.REL.DENS. TEST OF SUSPECT MATERIAL,SEE ALSO 1408,1409,1411. LEFT ABUTMENT.
1413	Y		SOURCE-NOT SPECIFIC. GRADATION ONLY. CHIMNEY.
1422	Y		SOURCE-NOT SPECIFIC. DENS.GRAD.REL.DENS. CHIMNEY.
1450	Y		SOURCE-NOT STATED. GRADATION ONLY. CHIMNEY.
1459	Y		SOURCE-NOT STATED. DENS.GRAD.REL.DENS. LEFT ABUTMENT.
1465	Y		SOURCE-NOT SPECIFIC. GRADATION ONLY. CHIMNEY.
1481	Y		SOURCE-NOT SPECIFIC. DENS.GRAD.REL.DENS. LEFT ABUTMENT.
1488	Y		SOURCE-NOT SPECIFIC. DENS.GRAD.REL.DENS. CHIMNEY.
1506	Y		SOURCE-CRUSHER BLEND. DENS.GRAD.REL.DENS. RIGHT ABUTMENT.
1604	Y		SOURCE-NOT SPECIFIC. DENS.GRAD.REL.DENS. CHIMNEY. FIRST OF THE YEAR.
1635	Y		SOURCE-NOT SPECIFIC. GRADATION ONLY. CHIMNEY.
1639	Y		SOURCE-NOT SPECIFIC. DENS.GRAD.REL.DENS. AREA 1550 TO 2100. CHIMNEY.
1683	Y		SOURCE-NOT SPECIFIC. DENS.GRAD.REL.DENS. CHIMNEY.
1692	Y		SOURCE-NOT SPECIFIC. DENS.GRAD.REL.DENS. CHIMNEY.
1705	Y		SOURCE-NOT SPECIFIC. DENS.GRAD.REL.DENS. RIGHT ABUTMENTBLANKET DRAIN. AREA NOT STATED.
1717	Y		SOURCE-NOT SPECIFIC. DENS.GRAD.REL.DENS. CHIMNEY.
1747	Y		SOURCE-NOT SPECIFIC. DENS.GRAD.REL.DENS. RIGHT ABUTMENT DRAIN BLANKET.AREA 2241 TO 2270,-80 TO TOE.

TEST NUMBER	TEST IN SPEC	STATUS FAILED TESTS	TEST COMMENTS
1753	Y		SOURCE-NOT SPECIFIC. DENS.GRAD.REL.DENS. CHIMNEY. AREA 1950 TO 2250.
1773	Y		SOURCE-NOT SPECIFIC. DENS.GRAD.REL.DENS. CHIMNEY. AREA 1300 TO 1950.
1788	Y		SOURCE-NOT STATED. DENS.GRAD.REL.DENS. RIGHT ABUTMENT DRAIN BLANKET. AREA NOT SPECIFIC.
1804	Y		SOURCE-RIDGEPOINT. DENS.GRAD.REL.DENS.CHIMNEY.
1832	Y		SOURCE-RIDGEPOINT. GRADATION ONLY. LEFT ABUTMENT, DRAIN BLANKET.
1845	Y		SOURCE-CRUSHER. DENS.GRAD.REL.DENS. CHIMNEY. AREA 1225 TO 2400.
1859	Y		SOURCE-NOT SPECIFIC. DENS.GRAD.REL.DENS. CHIMNEY. AREA 1500 TO 2375.
1875	Y		SOURCE-NOT SPECIFIC. DENS.GRAD.REL.DENS. CHIMNEY.
1936	Y		SOURCE-NOT SPECIFIC. DENS.GRAD.REL.DENS. CHIMNEY.
1993	Y		SOURCE-NOT SPECIFIC. DENS.GRAD.REL.DENS. CHIMNEY.
2028	N	OLD	SOURCE-NOT SPECIFIC. DENS.GRAD.REL.DENS. CHIMNEY, 1200 TO 2135.
2054	Y		SOURCE-NOT SPECIFIC. DENS.GRAD.REL.DENS. CHIMNEY.
2091	Y		SOURCE-NOT SPECIFIC. DENS.GRAD.RELDENS. CHIMNEY.
2105	Y		SOURCE-NOT SPECIFIC. DENS.GRAD.REL.DENS. RIGHT ABUTMENT DRAIN BLANKET.
2114	Y		SOURCE-NOT SPECIFIC. DENS.GRAD.REL.DENS. CHIMNEY.
2160	Y		SOURCE-NOT SPECIFIC. DENS.GRAD.REL.DENS. CHIMNEY.
2170	Y		SOURCE-NOT SPECIFIC. DENS.GRAD.REL.DENS. RIGHT ABUTMENT DRAIN BLANKET.
2191	Y		SOURCE-NOT SPECIFIC. DENS.GRAD.REL.DENS. CHIMNEY.
2194	Y		SOURCE-NOT SPECIFIC. DENS.GRAD.REL.DENS. CHIMNEY RIGHT ABUTMENT WEDGE. EDGE OF ZONE.
2195	Y		SOURCE-NOT SPECIFIC. DENS.GRAD. CHIMNEY RIGHT ABUTMENT WEDGE.
2212	Y		SOURCE-NOT SPECIFIC. DENS.GRAD.REL.DENS. CHIMNEY.
2236	Y		SOURCE-RIDGEPOINT. GRADATION ONLY. CHIMNEY.
2237	Y		SOURCE-RIDGEPOINT. GRADATION ONLY. CHIMNEY.
2244	Y		SOURCE-NOT SPECIFIC. DENS.GRAD.REL.DENS. LEFT ABUTMENT DRAIN BLANKET.
2248	N	OLD	SOURCE-NOT STATED. DENS.GRAD.REL.DENS. CHIMNEY.SEE ALSO RETEST 2248A.
2248A	Y		SOURCE-NOT STATED. DENSITY ONLY. GRADATION & MAX-MIN. FROM TEST 2248.
2264	Y		SOURCE-NOT SPECIFIC. DENS.GRAD.REL.DENS. CHIMNEY.
2289	Y		SOURCE-NOT SPECIFIC. DENS.GRAD.REL.DENS. CHIMNEY.
2323	Y		SOURCE-GENEVA ROCK. DENS.GRAD.REL.DENS. CHIMNEY.
2352	Y		SOURCE-NOT STATED. DENS.GRAD.REL.DENS. CHIMNEY.
2363	Y		SOURCE-NOT STATED. DENS.GRAD.REL.DENS. CHIMNEY.
2367	Y		SOURCE-AJ DEAN. DENS.GRAD.REL.DENS. CHIMNEY.

COMMENT: THIS REPORT COVERS THE ENTIRE CONSTRUCTION OF THE DAM.

LAB CHIEF: ____________________ SUBMITTED BY: ____________________
PROJECT ENGINEER



Represents all data from 1990, 1991, 1992

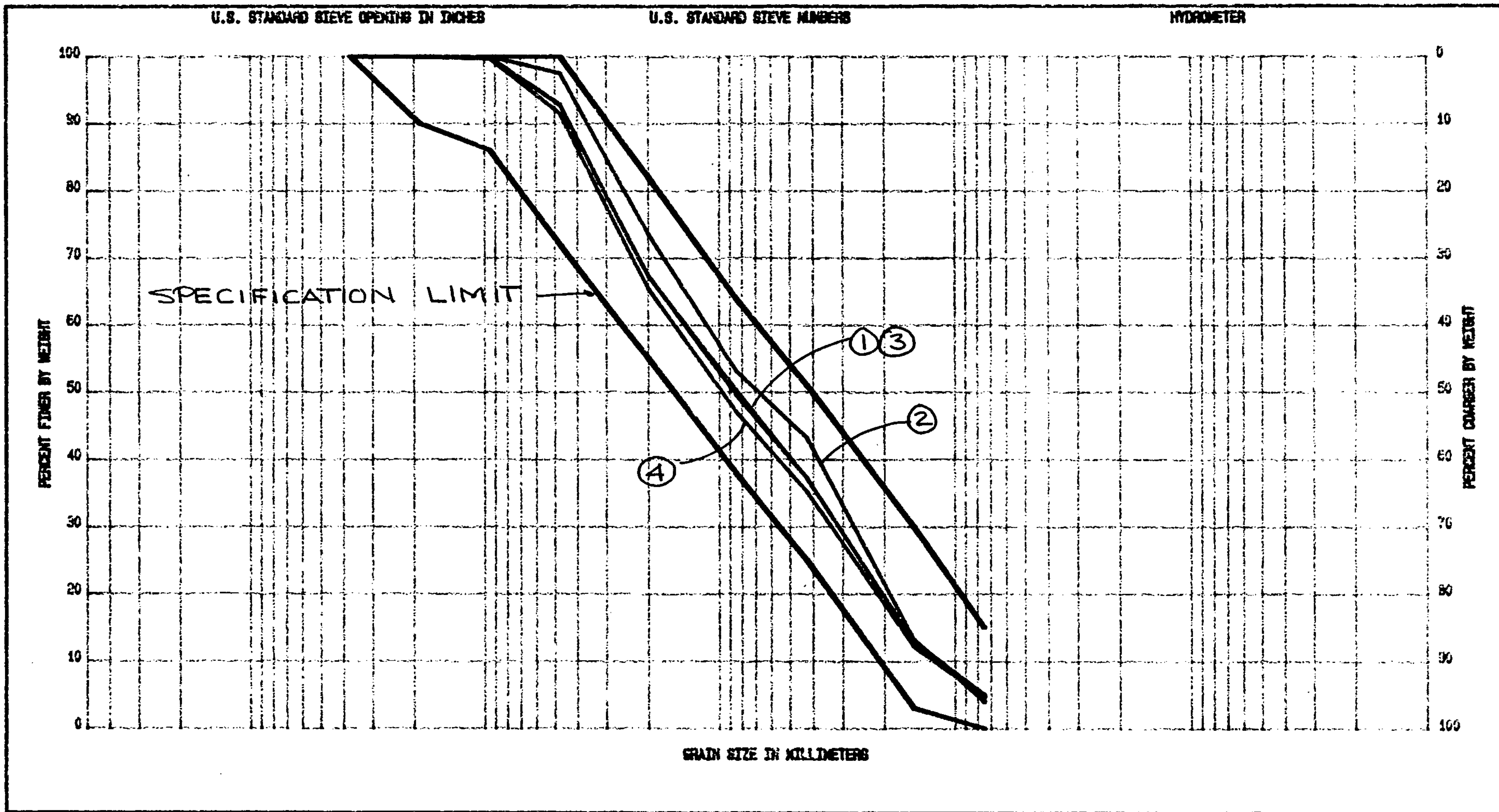
Project LITTLE DELL DAM

Area TRANSITION II

Boring No.

Date

GRADATION CURVES



1	1990, 1991, 1992
2	1990
3	1991
4	1992

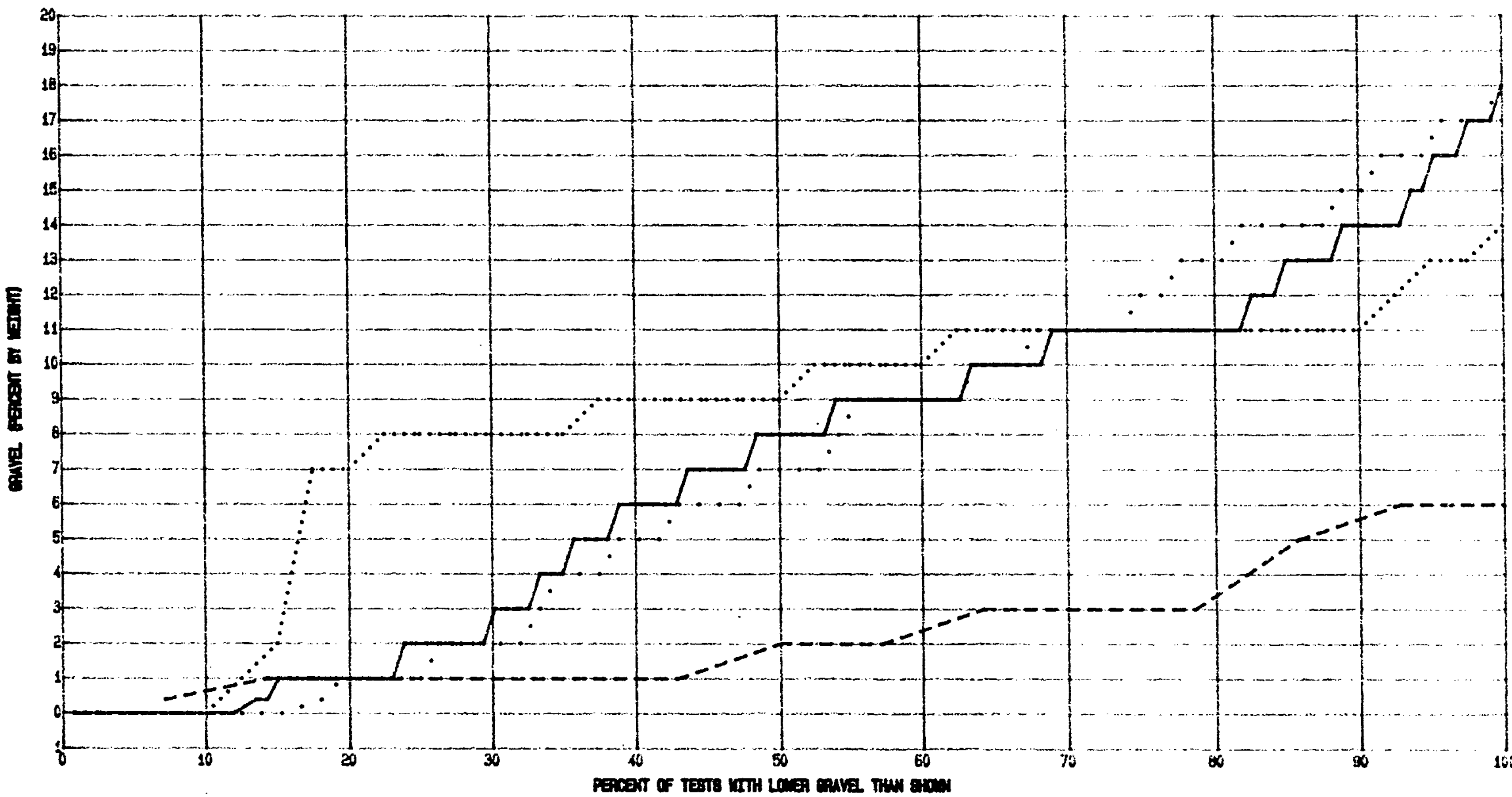
AVERAGE **GRADATION CURVES** BY YEAR

Project LITTLE DELL DAM

Area TRANSITION II

Boring No.

Date



Line Style	From Date	To Date	# Points	Mean	Std Dev	10 %	Median	90 %
....	01-01-92	12-31-92	40	8.575	3.795324	0	9	11
. . . . . .	01-01-91	12-31-91	72	7.286111	5.708786	0	7	15
— — — — —	01-01-90	12-31-90	14	2.528572	1.914491	.4	1	5
————	01-01-90	12-31-92	126	7.166667	5.141875	0	8	14

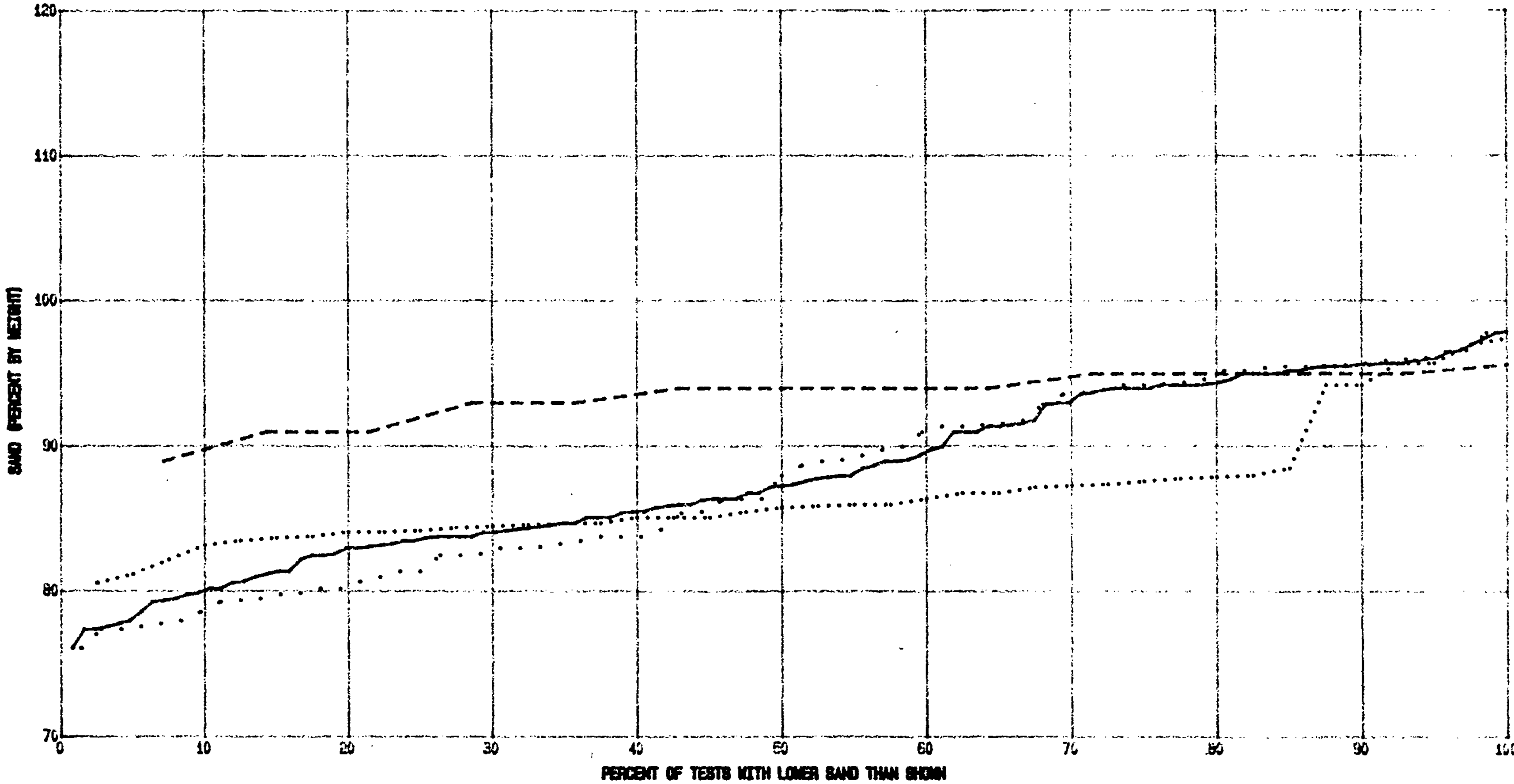
GRAVEL – S-CURVE

Project LITTLE DELL DAM

Area TRANSITION II

Boring No.

Date



Line Style	From Date	To Date	# Points	Mean	Std Dev	10 %	Median	90 %
....	01-01-92	12-31-92	40	86.84749	4.191904	83.2	85.5	94.2
. . . . . .	01-01-91	12-31-91	72	87.89168	6.611282	78.6	88.4	95.6
– – – – –	01-01-90	12-31-90	14	93.47143	1.91457	89	94	95
————	01-01-90	12-31-92	126	88.06587	5.875372	79.9	87.2	95.6

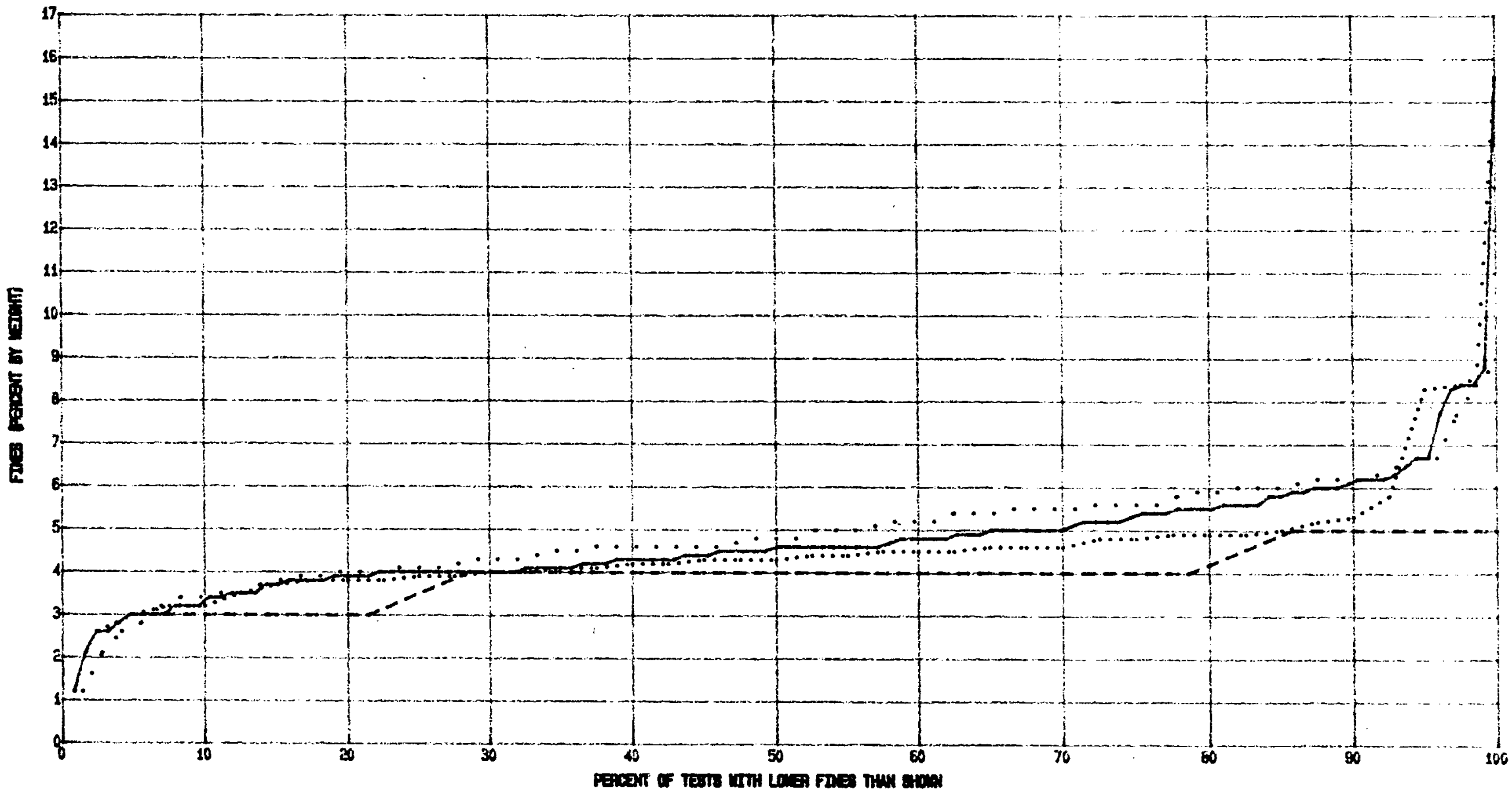
SAND – S-CURVE

Project LITTLE DELL DAM

Area TRANSITION II

Boring No.

Date



Line Style	From Date	To Date	# Points	Mean	Std Dev	10 %	Median	90 %
....	01-01-92	12-31-92	40	4.5775	1.298604	3.2	4.3	5.2
. . . . . .	01-01-91	12-31-91	72	5.022223	1.745511	3.4	4.8	6.2
– – – – –	01-01-90	12-31-90	14	4	.6793662	3	4	5
———	01-01-90	12-31-92	126	4.767461	1.555779	3.2	4.5	6.1

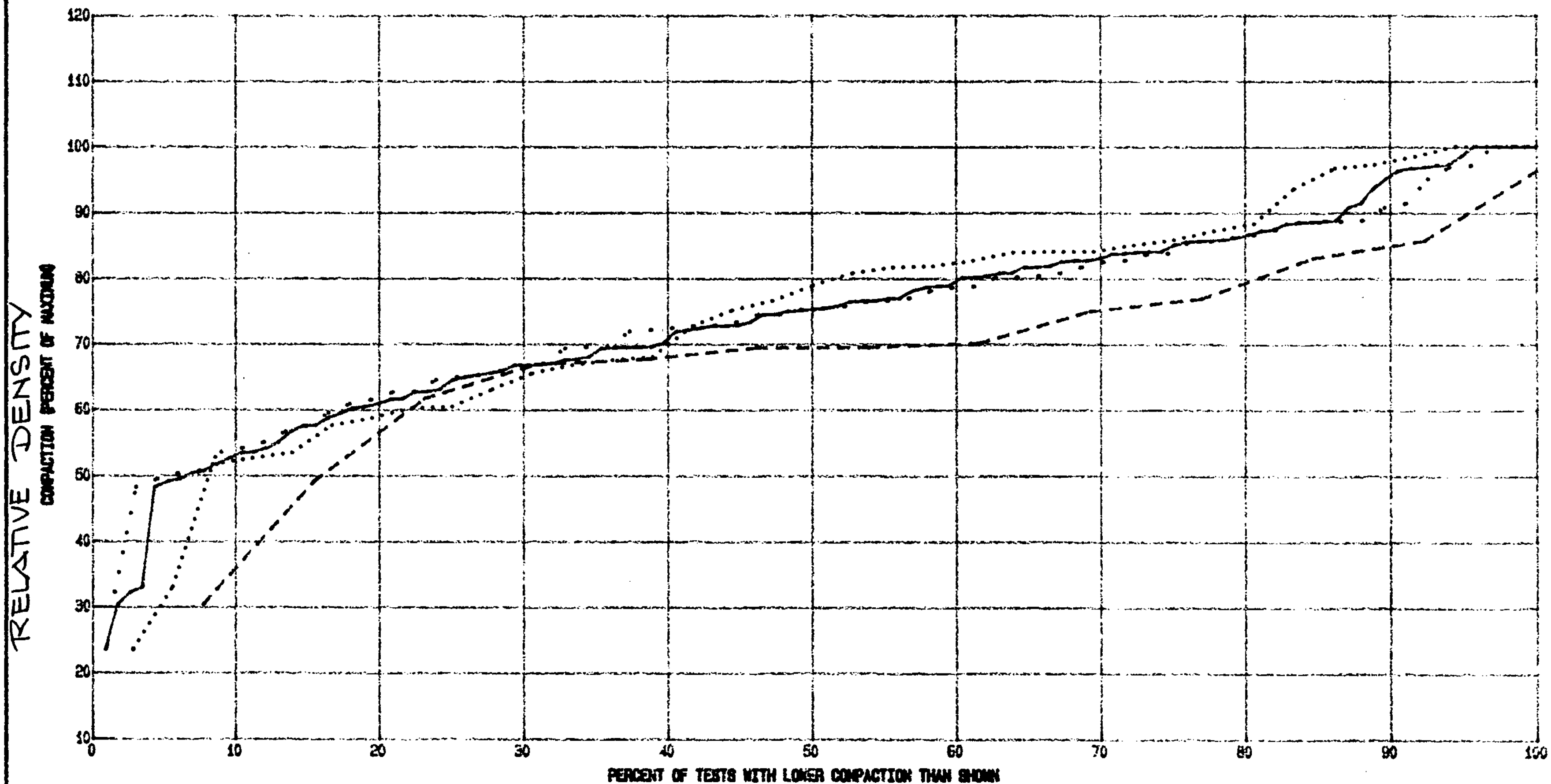
FINES - S-CURVE

Project LITTLE DELL DAM

Area TRANSITION II

Boring No.

Date



Line Style	From Date	To Date	# Points	Mean	Std Dev	10 %	Median	90 %
....	01-01-92	12-31-92	36	74.91562	18.57091	51.67609	76.88608	97.27789
. . . . . .	01-01-91	12-31-91	67	74.43417	14.31582	53.54856	76.25014	90.77596
– – – – –	01-01-90	12-31-90	13	69.35493	18.51692	30.36261	69.40966	83.03482
————	01-01-90	12-31-92	116	74.01434	15.93303	52.60231	76.25014	96.12811

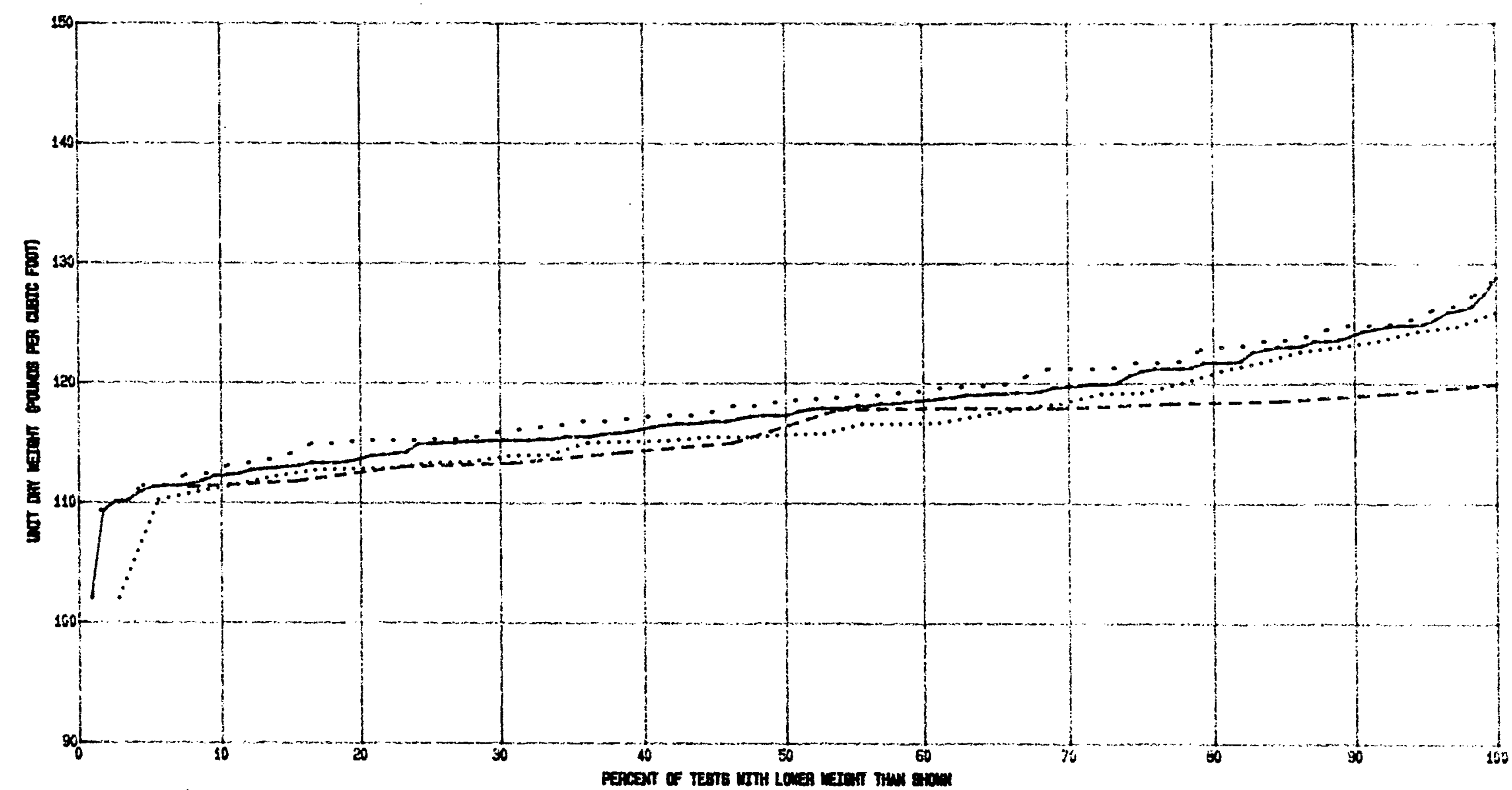
RELATIVE DENSITY/ COMPACTION - S-CURVE

Project LITTLE DELL DAM

Area TRANSITION II

Boring No.

Date



Line Style	From Date	To Date	# Points	Mean	Std Dev	10 %	Median	90 %
....	01-01-92	12-31-92	36	116.5556	4.875836	110.9	115.3	123
. . . . . .	01-01-91	12-31-91	67	118.6896	4.412699	112.4	118.4	124.8
- - - - - -	01-01-90	12-31-90	13	116	2.98721	111.3	116	118.5
———	01-01-90	12-31-92	116	117.7258	4.544822	112.2	117.3	123.9

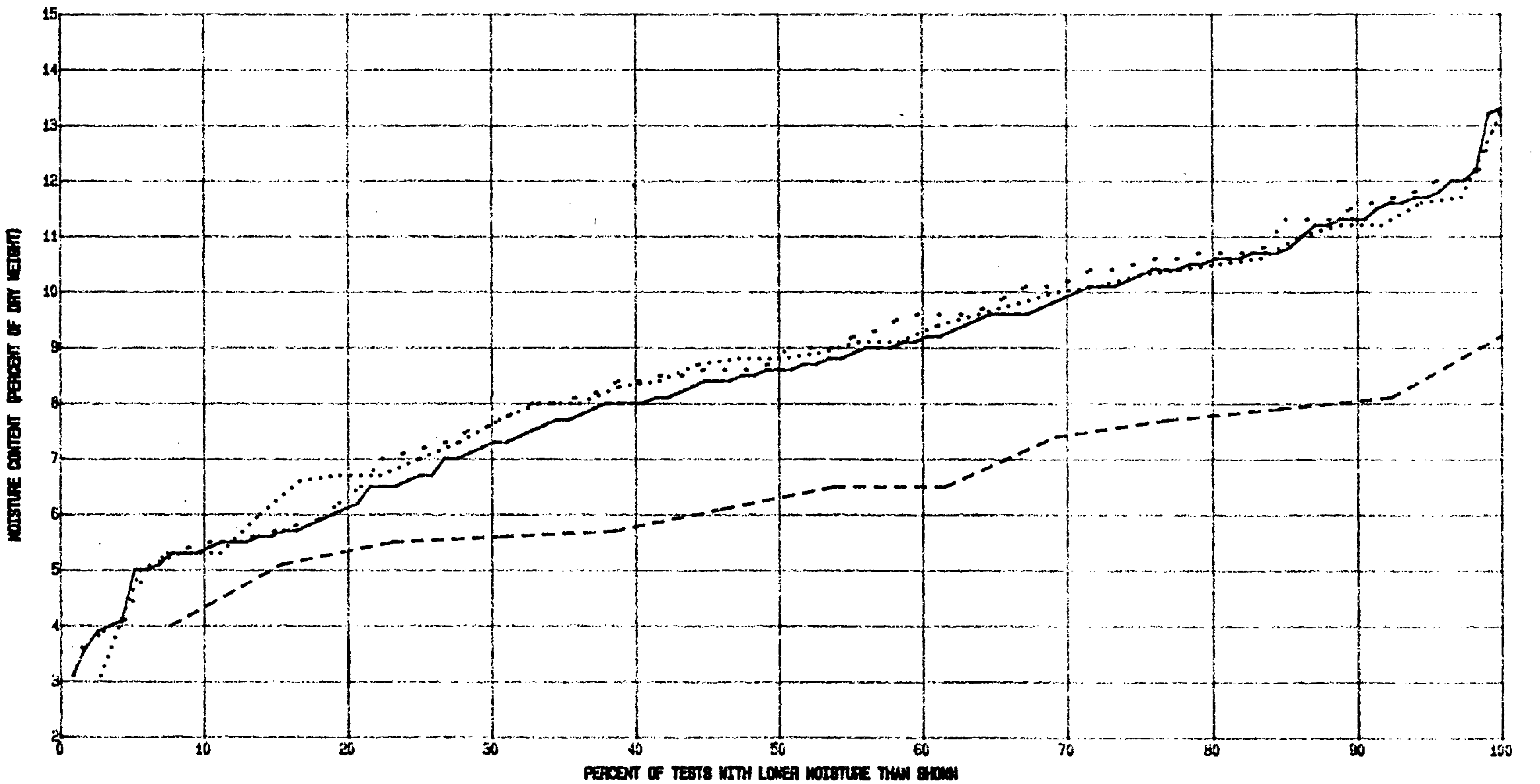
IN PLACE UNIT WEIGHT - S-CURVE

Project LITTLE DELL DAM

Area TRANSITION II

Boring No.

Date



Line Style	From Date	To Date	# Points	Mean	Std Dev	10 %	Median	90 %
....	01-01-92	12-31-92	36	8.705556	2.198944	5.3	8.8	11.2
. . . . . .	01-01-91	12-31-91	67	8.735822	2.280461	5.4	8.7	11.5
– – – – – –	01-01-90	12-31-90	13	6.561538	1.438485	4	6.1	7.9
————	01-01-90	12-31-92	116	8.482758	2.287889	5.3	8.6	11.3

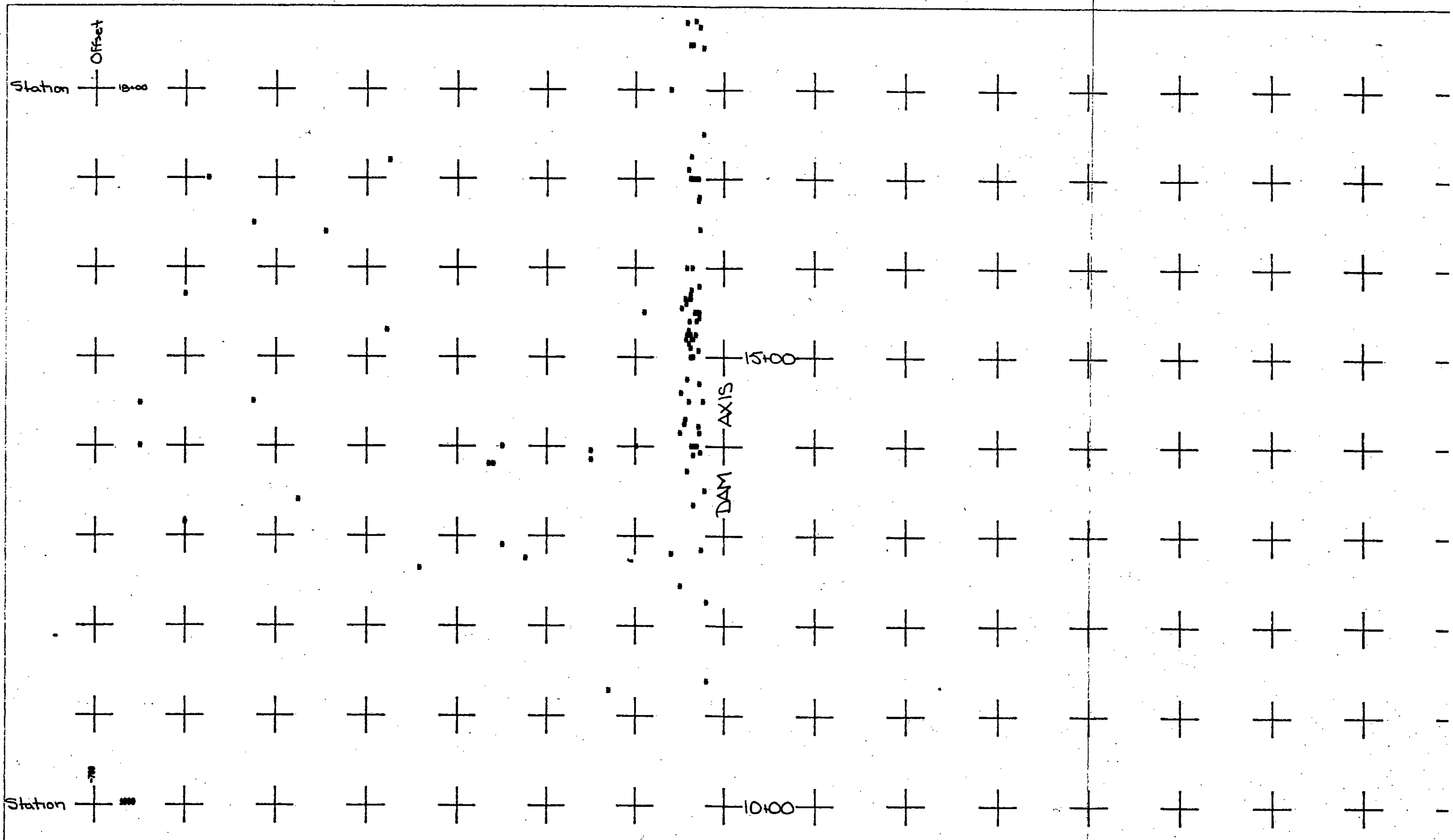
MOISTURE CONTENT – S-CURVE

Project LITTLE DELL DAM

Area TRANSITION II

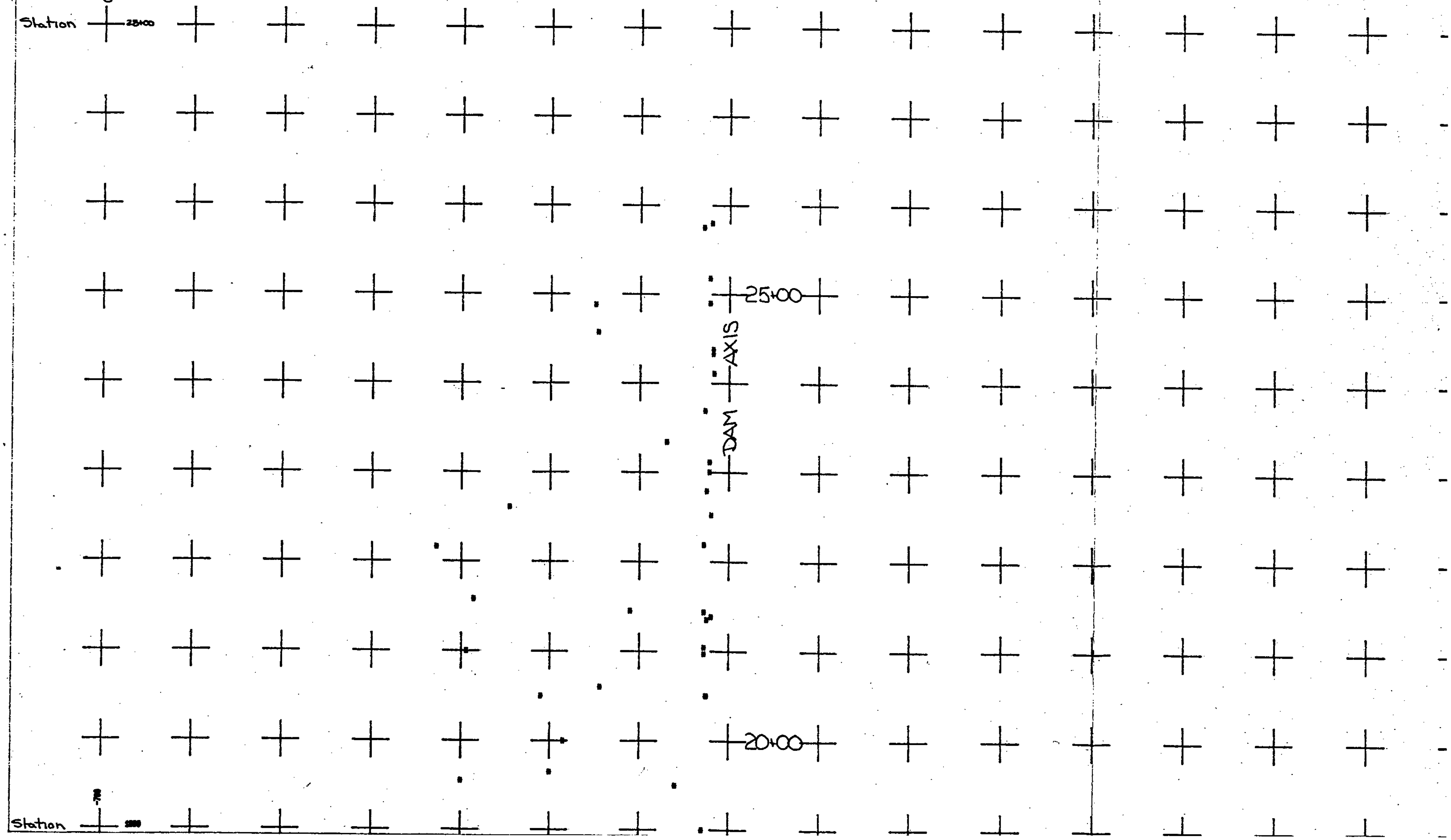
Boring No.

Date



TRANSITION II D/S SHELL TEST LOCATIONS

TRANSITION II D/S SHELL TEST LOCATIONS



APPENDIX II

FIELD CONTROL DATA, LITTLE DELL DAM

DRAIN FILL I
DOWNSTREAM SHELL

Specifications Comparison Report

Gradations Report

Comments Report

Gradation Curves

S Curves
- % Gravel
- % Sand
- % Fines

Test Locals

QUALITY ACCEPTANCE TESTING - SPECIFICATIONS COMPARISON REPORT — REPORT NUMBER: DI.0 —

PROJECT: LITTLE DELL LAKE, DAM AND APPURTENANCES RIVER: SALT LAKE CITY STREAMS STATE: UTAH TOWN: SALT LAKE CITY	CONTRACT NO. DACW05-89-C-0045 CONTRACTOR: CLEMENT BROTHERS AND J.E. STARNES CO.	DATE OF REPORT: 12-11-92 01-01-90 THRU 12-31-92

EMBANKMENT ZONE	MIN. DESIGNED % COMP	SPEC. W.C. % RANGE	LOOSE LIFT THICK. (IN)	NUMBER OF PASSES	COMPACTION EQUIPMENT
DRAIN FILL I	50		12	2	IR SD150D

TEST NUMBER	DATE	ELEV	LOCATION STATION	LOCATION OFFSET	% COBBL	% GRAV	% SAND	% FINES	% COMPACTION DESIGN >= 50%	MOISTURE IN SPEC %- %	GRADATION IN SPEC	GRAVELS IN SPEC > %	FINES IN SPEC < 1.5%	TEST IN SPEC	STATUS FAILED TESTS
521A	10-10-90	5581.0	1425	-150	0.0	85.0	14.0	1.0	-	-	N	-	Y	N	RM
523	10-10-90	5583.3	1485	-100	0.0	90.0	9.0	1.0	-	-	Y	-	Y	Y	RM
529	10-11-90	5577.6	1445	-100	0.0	81.0	18.0	1.0	-	-	N	-	Y	N	RM
533	10-12-90	5578.0	1450	-225	0.0	93.0	6.0	1.0	-	-	Y	-	Y	Y	
538	10-13-90	5579.8	1425	-165	0.0	90.0	9.6	.4	-	-	Y	-	Y	Y	
541	10-15-90	5577.0	1545	-105	0.0	95.0	4.4	.6	-	-	Y	-	Y	Y	
543	10-17-90	5579.0	1550	-90	0.0	95.0	4.7	.3	-	-	Y	-	Y	Y	
564	10-24-90	5580.0	1440	-85	0.0	97.0	2.3	.7	-	-	Y	-	Y	Y	
565	10-25-90	5579.0	1560	-80	0.0	98.0	1.6	.4	-	-	Y	-	Y	Y	
572	10-27-90	5583.0	1415	-55	0.0	98.0	1.1	.9	-	-	Y	-	Y	Y	
574	10-27-90	5582.0	1475	-55	0.0	99.0	.9	.1	-	-	Y	-	Y	Y	
577	10-27-90	5583.0	1450	-75	0.0	99.0	.9	.1	-	-	Y	-	Y	Y	
583	10-28-90	5582.0	1615	-90	0.0	98.0	1.5	.5	-	-	Y	-	Y	Y	
584	10-28-90	5585.0	1610	-65	0.0	98.0	1.4	.6	-	-	Y	-	Y	Y	
595	10-30-90	5582.0	1400	-75	0.0	97.0	2.2	.8	-	-	Y	-	Y	Y	
667	05-18-91	5580.2	1625	-195	0.0	92.0	6.8	1.2	-	-	Y	-	Y	Y	
676	05-20-91	5579.6	1675	-300	0.0	90.0	8.8	1.2	-	-	Y	-	Y	Y	
683	05-22-91	5580.0	1700	-440	0.0	91.0	7.5	1.5	-	-	Y	-	Y	Y	
690	05-24-91	5573.0	1525	-200	0.0	92.0	6.6	1.4	-	-	Y	-	Y	Y	
691	05-28-91	5574.4	1522	-400	0.0	90.0	8.7	1.3	-	-	Y	-	Y	Y	
709	06-04-91	5576.5	1480	-275	0.0	89.0	8.9	**2.1**	-	-	N	-	N	N	
714	06-05-91	5580.0	1423	-287	0.0	86.0	10.8	**3.2**	-	-	N	-	N	N	RM
732	06-07-91	5578.2	1432	-525	0.0	83.0	15.6	1.4	-	-	N	-	Y	N	
714A	06-08-91	5577.2	1464	-288	0.0	96.0	3.6	.4	-	-	Y	-	Y	Y	
735	06-08-91	5564.6	1452	-545	0.0	89.0	9.7	1.3	-	-	N	-	Y	N	
756	06-13-91	5568.3	1490	-535	0.0	89.0	8.6	**2.4**	-	-	N	-	N	N	
771	06-14-91	5570.0	1440	-500	0.0	93.0	6.5	.5	-	-	Y	-	Y	Y	
775	06-17-91	5572.5	1560	-600	0.0	95.0	2.8	**2.2**	-	-	N	-	N	N	
787	06-19-91	5578.6	1550	-600	0.0	96.0	3.6	.4	-	-	Y	-	Y	Y	
791	06-20-91	5585.6	1380	-155	0.0	97.0	2.8	.2	-	-	N	-	Y	N	
798	06-22-91	5582.1	1395	-300	0.0	93.0	5.9	1.1	-	-	Y	-	Y	Y	
813	06-25-91	5585.8	1700	-300	0.0	93.0	5.5	1.5	-	-	Y	-	Y	Y	
814	06-25-91	5588.9	1400	-250	0.0	91.0	7.5	1.5	-	-	Y	-	Y	Y	
822	06-26-91	5581.4	1640	-530	0.0	95.0	4.3	.7	-	-	Y	-	Y	Y	
832	06-28-91	5575.0	1310	-600	0.0	94.0	5.3	.7	-	-	Y	-	Y	Y	
836	06-28-91	5586.3	1650	-525	0.0	94.0	5.3	.7	-	-	Y	-	Y	Y	
858	07-02-91	5587.0	1335	-475	0.0	92.0	7.6	.4	-	-	Y	-	Y	Y	
877	07-08-91	5593.2	1325	-150	0.0	95.0	4.4	.6	-	-	Y	-	Y	Y	
914	07-16-91	5593.0	1630	-640	0.0	91.0	4.2	**4.8**	-	-	N	-	N	N	
968	07-26-91	5603.8	1372	-280	0.0	93.0	6.0	1.0	-	-	Y	-	Y	Y	
990	07-31-91	5605.6	1372	-375	0.0	92.0	6.1	**1.9**	-	-	N	-	N	N	
1034	08-07-91	5620.8	1720	-425	0.0	96.0	3.4	.6	-	-	Y	-	Y	Y	
1081	08-13-91	5615.7	1376	-525	0.0	97.0	2.6	.4	-	-	N	-	Y	N	

QUALITY ACCEPTANCE TESTING - SPECIFICATIONS COMPARISON REPORT   REPORT NUMBER: DI.0

TEST NUMBER	DATE	ELEV	LOCATION		% COBBL	% GRAV	% SAND	% FINES	% COMPACTION DESIGN >= 50%	MOISTURE IN SPEC %- %	GRADATION IN SPEC	GRAVELS IN SPEC > %	FINES IN SPEC < 1.5%	TEST IN SPEC	STATUS FAILED TESTS
			STATION	OFFSET											
1115	08-19-91	5626.1	1850	-260	0.0	99.0	.7	.3	-	-	N	-	Y	N	
1148	08-22-91	5629.6	1860	-250	0.0	96.0	3.7	.3	-	-	Y	-	Y	Y	
1261	09-03-91	5638.5	1285	-400	0.0	94.0	4.6	1.4	-	-	Y	-	Y	Y	
1274	09-05-91	5636.7	2040	-200	0.0	92.0	7.2	.8	-	-	Y	-	Y	Y	
1307	09-17-91	5646.4	1940	-300	0.0	97.0	2.7	.3	-	-	Y	-	Y	Y	
1321	09-20-91	5647.5	1991	-226	0.0	92.0	7.3	.7	-	-	Y	-	Y	Y	
1340	09-23-91	5651.8	2100	-180	0.0	92.0	7.3	.7	-	-	Y	-	Y	Y	
1371	10-01-91	5654.3	1991	-300	0.0	94.0	5.0	1.0	-	-	Y	-	Y	Y	
1460	10-11-91	5651.7	1261	-349	0.0	94.0	4.1	**1.9**	-	-	N	-	N	N	
1482	10-16-91	5661.4	1272	-236	0.0	89.0	8.8	**2.2**	-	-	N	-	N	N	
1606	04-13-92	5665.1	1274	-256	0.0	94.0	4.7	1.3	-	-	Y	-	Y	Y	
1646	04-27-92	5672.0	2231	-117	0.0	92.0	6.2	**1.8**	-	-	N	-	N	N	
1674	04-30-92	5670.7	1252	-307	0.0	88.0	7.1	**4.9**	-	-	N	-	N	N	
1682	05-02-92	5673.1	1272	-76	0.0	90.0	6.8	**3.2**	-	-	N	-	N	N	
1690	05-05-92	5669.3	1268	-113	0.0	92.0	6.2	**1.8**	-	-	N	-	N	N	
1706	05-11-92	5675.3	2224	-328	0.0	95.0	4.4	.6	-	-	Y	-	Y	Y	
1737	05-18-92	5680.9	2245	-212	0.0	97.0	2.0	1.0	-	-	Y	-	Y	Y	
1746	05-22-92	5688.1	2270	-140	0.0	93.0	5.7	1.3	-	-	Y	-	Y	Y	
1761	05-28-92	5683.4	1252	-200	0.0	96.0	1.6	**2.4**	-	-	N	-	N	N	
1794	06-03-92	5690.2	2304	-300	2.0	93.0	4.4	.6	-	-	N	-	Y	N	
1806	06-05-92	5692.2	1236	-52	0.0	94.0	5.0	1.0	-	-	Y	-	Y	Y	
1815	06-08-92	5692.5	2346	-219	0.0	86.0	12.5	1.5	-	-	N	-	Y	N	
1833	06-10-92	5696.0	1240	-50	0.0	94.0	5.0	1.0	-	-	Y	-	Y	Y	
1858	06-19-92	5702.5	2413	-100	0.0	93.0	6.0	1.0	-	-	Y	-	Y	Y	
1893	06-25-92	5705.3	1229	-40	0.0	88.0	11.0	1.0	-	-	N	-	Y	N	
1955	07-08-92	5711.4	1219	-69	0.0	95.0	4.6	.4	-	-	Y	-	Y	Y	
1962	07-09-92	5709.5	2377	-200	0.0	95.0	4.1	.9	-	-	Y	-	Y	Y	
1983	07-16-92	5714.3	1212	-140	0.0	94.0	5.1	.9	-	-	Y	-	Y	Y	
2013	07-20-92	5718.5	2451	-100	0.0	91.0	7.7	1.3	-	-	Y	-	Y	Y	
2025	07-22-92	5721.8	1203	-142	0.0	95.0	4.2	.8	-	-	Y	-	Y	Y	
2048	07-28-92	5721.1	2415	-250	0.0	95.0	4.2	.8	-	-	Y	-	Y	Y	
2081	07-31-92	5728.8	1180	-170	0.0	94.0	4.4	**1.6**	-	-	N	-	N	N	
2106	08-04-92	5728.2	2462	-139	0.0	96.0	3.5	.5	-	-	Y	-	Y	Y	
2172	08-14-92	5740.9	2494	-150	0.0	96.0	3.5	.5	-	-	Y	-	Y	Y	
2245	08-28-92	5762.8	1123	-128	0.0	94.0	4.2	**1.8**	-	-	N	-	N	N	
2308	09-13-92	5778.7	1099	-50	0.0	96.0	3.0	1.0	-	-	Y	-	Y	Y	
2327	09-17-92	5778.9	2625	-80	0.0	98.0	1.5	.5	-	-	N	-	Y	N	

QUALITY ACCEPTANCE TESTING - SPECIFICATIONS COMPARISON REPORT	REPORT NUMBER: DI.0	PAGE 3 OF 3

TEST NUMBER	DATE	ELEV	LOCATION STATION	LOCATION OFFSET	% COBBL	% GRAV	% SAND	% FINES	% COMPACTION DESIGN >= 50%	MOISTURE IN SPEC %- %	GRADATION IN SPEC	GRAVELS IN SPEC > %	FINES IN SPEC < 1.5%	TEST IN SPEC	STATUS FAILED TESTS

NOTE: These statistics include only results of tests that are NOT designated as RM, RW, or RW,RT.		% COMPACTION DESIGN >= 50%	MOISTURE IN SPEC	GRADATION IN SPEC	GRAVELS IN SPEC	FINES IN SPEC	TEST IN SPEC
	FAILING TEST LOCATIONS	0	0	23	0	14	23
	PASSING TEST LOCATIONS	0	0	53	0	62	53
	TOTAL TEST LOCATIONS	0	0	76	0	76	76
	% FAILING TEST LOCATIONS	0.0	0.0	30.3	0.0	18.4	30.3

REMARKS LEGEND

RM - Test Location Removed
RW - Test Loc. Reworked and NOT Retested
RW,RT - Test Loc. Reworked and Retested
AR - Additional Rolling at Test Location

TEST LOCATIONS REWORKED - UNTESTED..	0
TEST LOCATIONS REWORKED - RETESTED..	0
TEST LOCATIONS REMOVED.............	4
FAILED TEST LOCATIONS NOT REWORKED OR RETESTED..	23
PERCENT OF FAILED TEST LOCATIONS NOT REWORKED OR RETESTED IN PERMANENT FILL..	30.3

COMMENT: THIS REPORT COVERS THE ENTIRE CONSTRUCTION OF THE DAM.

LAB CHIEF: ____________________

SUBMITTED BY: ____________________
PROJECT ENGINEER

QUALITY ACCEPTANCE TESTING - GRADATIONS REPORT | REPORT NUMBER: DI.1 |

PROJECT: LITTLE DELL LAKE, DAM AND APPURTENANCES RIVER: SALT LAKE CITY STREAMS STATE: UTAH TOWN: SALT LAKE CITY	CONTRACT NO. DACW05-89-C-0045 CONTRACTOR: CLEMENT BROTHERS AND J.E. STARNES CO.	DATE OF REPORT: 12-11-92 01-01-90 THRU 12-31-92

EMBANKMENT ZONE	MIN. DESIGNED % COMP	SPEC. W.C. % RANGE	LOOSE LIFT THICK. (IN)	NUMBER OF PASSES	COMPACTION EQUIPMENT
DRAIN FILL I	50		12	2	IR SD150D

TEST NUMBER	DATE	ELEV	LOCATION		GRADATION - PERCENT PASSING										LL	PI	CLASSIFICATION
			STATION	OFFSET	1.5IN	1 IN	3/4IN	1/2IN	3/8IN	# 4	# 8	#200					
521A	10-10-90	5581.0	1425	-150	100.0	100.0	94.0	73.0	56.0	15.0	3.0	1.0					GP
523	10-10-90	5583.3	1485	-100	100.0	100.0	95.0	69.0	50.0	10.0	2.0	1.0					GP
529	10-11-90	5577.6	1445	-100	100.0	100.0	95.0	76.0	60.0	19.0	3.0	1.0					GP
533	10-12-90	5578.0	1450	-225	100.0	100.0	93.0	59.0	41.0	7.0	1.0	1.0					GP
538	10-13-90	5579.8	1425	-165	100.0	100.0	90.0	65.0	49.0	10.0	2.0	.4					GP
541	10-15-90	5577.0	1545	-105	100.0	100.0	90.0	65.0	46.0	5.0	1.3	.6					GP
543	10-17-90	5579.0	1550	-90	100.0	100.0	83.0	45.0	29.0	5.0	1.0	.3					GP
564	10-24-90	5580.0	1440	-85	100.0	100.0	94.0	68.0	46.0	3.0	1.0	.7					GP
565	10-25-90	5579.0	1560	-80	100.0	100.0	92.0	50.0	25.0	2.0	1.0	.4					GP
572	10-27-90	5583.0	1415	-55	100.0	100.0	94.0	64.0	42.0	2.0	1.0	.9					GP
574	10-27-90	5582.0	1475	-55	100.0	100.0	91.0	58.0	37.0	1.0	.4	.1					GP
577	10-27-90	5583.0	1450	-75	100.0	100.0	91.0	28.0	28.0	1.0	.4	.1					GP
583	10-28-90	5582.0	1615	-90	100.0	100.0	96.0	66.0	41.0	2.0	1.0	.5					GP
584	10-28-90	5585.0	1610	-65	100.0	100.0	93.0	65.0	42.0	2.0	1.2	.6					GP
595	10-30-90	5582.0	1400	-75	100.0	100.0	93.0	63.0	41.0	3.0	1.6	.8					GP
667	05-18-91	5580.2	1625	-195	100.0	100.0	89.0	51.0	37.0	8.0	2.5	1.2					GP
676	05-20-91	5579.6	1675	-300	100.0	100.0	89.0	48.0	33.0	10.0	4.3	1.2					GP
683	05-22-91	5580.0	1700	-440	100.0	100.0	92.0	52.0	34.0	9.0	4.0	1.5					GP
690	05-24-91	5573.0	1525	-200	100.0	99.0	72.0	34.0	23.0	8.0	4.4	1.4					GP
691	05-28-91	5574.4	1522	-400	100.0	96.0	74.0	40.0	28.0	10.0	4.9	1.3					GP
709	06-04-91	5576.5	1480	-275	100.0	97.0	74.0	43.0	31.0	11.0	6.0	2.1					GP
714	06-05-91	5580.0	1423	-287	100.0	98.0	75.0	50.0	38.0	14.0	7.0	3.2					GP
732	06-07-91	5578.2	1432	-525	100.0	100.0	86.0	56.0	44.0	17.0	8.0	1.4					GP
714A	06-08-91	5577.2	1464	-288	100.0	100.0	76.0	37.0	22.0	4.0	2.0	.4					GP
735	06-08-91	5564.6	1452	-545	100.0	99.0	81.0	52.0	37.0	11.0	4.0	1.3					GP
756	06-13-91	5568.3	1490	-535	100.0	99.0	85.0	53.0	36.0	11.0	6.0	2.4					GP
771	06-14-91	5570.0	1440	-500	100.0	100.0	69.0	45.0	21.0	7.0	4.0	.5					GP
775	06-17-91	5572.5	1560	-600	100.0	100.0	91.0	40.0	22.0	5.0	4.0	2.2					GP
787	06-19-91	5578.6	1550	-600	100.0	100.0	78.0	32.0	17.0	4.0	2.3	.4					GP
791	06-20-91	5585.6	1380	-155	100.0	100.0	70.0	25.0	12.0	3.0	2.0	.2					GP
798	06-22-91	5582.1	1395	-300	100.0	99.0	83.0	48.0	34.0	7.0	3.0	1.1					GP
813	06-25-91	5585.8	1700	-300	100.0	100.0	83.0	42.0	25.0	7.0	4.0	1.5					GP
814	06-25-91	5588.9	1400	-250	100.0	100.0	85.0	46.0	30.0	9.0	5.0	1.5					GP
822	06-26-91	5581.4	1640	-530	100.0	100.0	76.0	31.0	18.0	5.0	3.0	.7					GP
832	06-28-91	5575.0	1310	-600	100.0	100.0	83.0	44.0	27.0	6.0	3.0	.7					GP
836	06-28-91	5586.3	1650	-525	100.0	100.0	84.0	44.0	38.0	6.0	3.0	.7					GP
858	07-02-91	5587.0	1335	-475	100.0	100.0	86.0	54.0	36.0	8.0	4.0	.4					GP
877	07-08-91	5593.2	1325	-150	100.0	99.0	90.0	54.0	32.0	5.0	2.0	.6					GP
914	07-16-91	5593.0	1630	-640	100.0	100.0	82.0	47.0	30.0	9.0	5.0	4.8					GP
968	07-26-91	5603.8	1372	-280	100.0	100.0	91.0	64.0	40.0	7.0	4.0	1.0					GP
990	07-31-91	5605.6	1372	-375	100.0	100.0	86.0	46.0	29.0	8.0	5.0	1.9					GP
1034	08-07-91	5620.8	1720	-425	100.0	100.0	89.0	51.0	29.0	4.0	2.0	.6					GP
1081	08-13-91	5615.7	1376	-525	100.0	96.0	72.0	26.0	14.0	3.0	2.0	.4					GP

QUALITY ACCEPTANCE TESTING - GRADATIONS REPORT REPORT NUMBER: DI.1

TEST NUMBER	DATE	ELEV	LOCATION		GRADATION - PERCENT PASSING										LL	PI	CLASSIFICATION
			STATION	OFFSET	1.5IN	1 IN	3/4IN	1/2IN	3/8IN	# 4	# 8	#200					
1115	08-19-91	5626.1	1850	-260	100.0	**92.0**	64.0	25.5	**12.0**	1.0	.6	.3					GP
1148	08-22-91	5629.6	1860	-250	100.0	97.0	76.0	45.0	27.0	4.0	2.0	.3					GP
1261	09-03-91	5638.5	1285	-400	100.0	100.0	90.0	55.0	30.0	6.0	4.0	1.4					GP
1274	09-05-91	5636.7	2040	-200	100.0	99.0	90.0	58.0	33.0	8.0	5.0	.8					GP
1307	09-17-91	5646.4	1940	-300	100.0	100.0	86.0	44.0	20.0	3.0	2.0	.3					GP
1321	09-20-91	5647.5	1991	-226	100.0	100.0	93.0	66.0	45.0	8.0	3.0	.7					GP
1340	09-23-91	5651.8	2100	-180	100.0	100.0	88.0	56.0	39.0	8.0	2.0	.7					GP
1371	10-01-91	5654.3	1991	-300	100.0	98.0	84.0	49.0	32.0	6.0	2.0	1.0					GP
1460	10-11-91	5651.7	1261	-349	100.0	100.0	92.0	65.0	43.0	6.0	3.0	**1.9**					GP
1482	10-16-91	5661.4	1272	-236	100.0	100.0	89.0	66.0	48.0	**11.0**	5.0	**2.2**					GP
1606	04-13-92	5665.1	1274	-256	100.0	99.0	78.0	39.0	25.0	6.0	3.0	1.3					GP
1646	04-27-92	5672.0	2231	-117	100.0	100.0	84.0	43.0	27.0	8.0	5.0	**1.8**					GP
1674	04-30-92	5670.7	1252	-307	100.0	99.0	84.0	46.0	30.0	**12.0**	**8.0**	**4.9**					GP
1682	05-02-92	5673.1	1272	-76	100.0	100.0	89.0	52.0	35.0	10.0	**6.0**	**3.2**					GP
1690	05-05-92	5669.3	1268	-113	100.0	99.0	82.0	41.0	27.0	8.0	5.0	**1.8**					GP
1706	05-11-92	5675.3	2224	-328	100.0	100.0	84.0	46.0	29.0	5.0	3.0	.6					GP
1737	05-18-92	5680.9	2245	-212	100.0	100.0	80.0	43.0	24.0	3.0	2.0	1.0					GP
1746	05-22-92	5688.1	2270	-140	100.0	99.0	85.0	46.0	27.0	7.0	4.0	1.3					GP
1761	05-28-92	5683.4	1252	-200	100.0	100.0	80.0	32.0	17.0	4.0	3.0	**2.4**					GP
1794	06-03-92	5690.2	2304	-300	**98.0**	97.0	82.0	45.0	28.0	5.0	2.5	.6					GP
1806	06-05-92	5692.2	1236	-52	100.0	100.0	85.0	52.0	33.0	6.0	2.0	1.0					GP
1815	06-08-92	5692.5	2346	-219	100.0	99.0	93.0	62.0	46.0	**14.0**	**6.0**	1.5					GP
1833	06-10-92	5696.0	1240	-50	100.0	100.0	86.0	57.0	36.0	6.0	2.0	1.0					GP
1858	06-19-92	5702.5	2413	-100	100.0	100.0	89.0	57.0	38.0	7.0	3.0	1.0					GP
1893	06-25-92	5705.3	1229	-40	100.0	99.0	89.0	62.0	44.0	**12.0**	5.0	1.0					GP
1955	07-08-92	5711.4	1219	-69	100.0	99.0	82.0	50.0	33.0	5.0	2.0	.4					GP
1962	07-09-92	5709.5	2377	-200	100.0	100.0	86.0	58.0	38.0	5.0	3.0	.9					GP
1983	07-16-92	5714.3	1212	-140	100.0	100.0	85.0	53.0	35.0	6.0	3.0	.9					GP
2013	07-20-92	5718.5	2451	-100	100.0	100.0	91.0	69.0	50.0	9.0	3.0	1.3					GP
2025	07-22-92	5721.8	1203	-142	100.0	99.0	89.0	66.0	44.0	5.0	2.0	.8					GP
2048	07-28-92	5721.1	2415	-250	100.0	100.0	86.0	52.0	33.0	5.0	2.0	.8					GP
2081	07-31-92	5728.8	1180	-170	100.0	100.0	90.0	59.0	35.0	6.0	4.0	**1.6**					GP
2106	08-04-92	5728.2	2462	-139	100.0	98.0	89.0	59.0	39.0	4.0	1.4	.5					GP
2172	08-14-92	5740.9	2494	-150	100.0	100.0	95.0	50.0	24.0	4.0	2.0	.5					GP
2245	08-28-92	5762.8	1123	-128	100.0	100.0	92.0	51.0	27.0	6.0	4.2	**1.8**					GP
2308	09-13-92	5778.7	1099	-50	100.0	99.0	86.0	42.0	23.0	4.0	3.0	1.0					GP
2327	09-17-92	5778.9	2625	-80	100.0	100.0	99.0	35.0	**16.0**	2.0	1.0	.5					GP

NOTE - Emphasized Numbers indicate percent passing outside of gradation range specified.

COMMENT: THIS REPORT COVERS THE ENTIRE CONSTRUCTION OF THE DAM.

LAB CHIEF: ____________________ SUBMITTED BY: ____________________

PROJECT ENGINEER

Note: Specification require no clay or objectionable coatings

A threshold / warning limit was set at 1.5% fines.

PROJECT: LITTLE DELL LAKE, DAM AND APPURTENANCES RIVER: SALT LAKE CITY STREAMS STATE: UTAH TOWN: SALT LAKE CITY	CONTRACT NO. DACW05-89-C-0045 CONTRACTOR: CLEMENT BROTHERS AND J.E. STARNES CO.	DATE OF REPORT: 12-11-92 01-01-90 THRU 12-31-92

EMBANKMENT ZONE	MIN. DESIGNED % COMP	SPEC. W.C. % RANGE	LOOSE LIFT THICK. (IN)	NUMBER OF PASSES	COMPACTION EQUIPMENT
DRAIN FILL I	50		12	2	IR SD150D

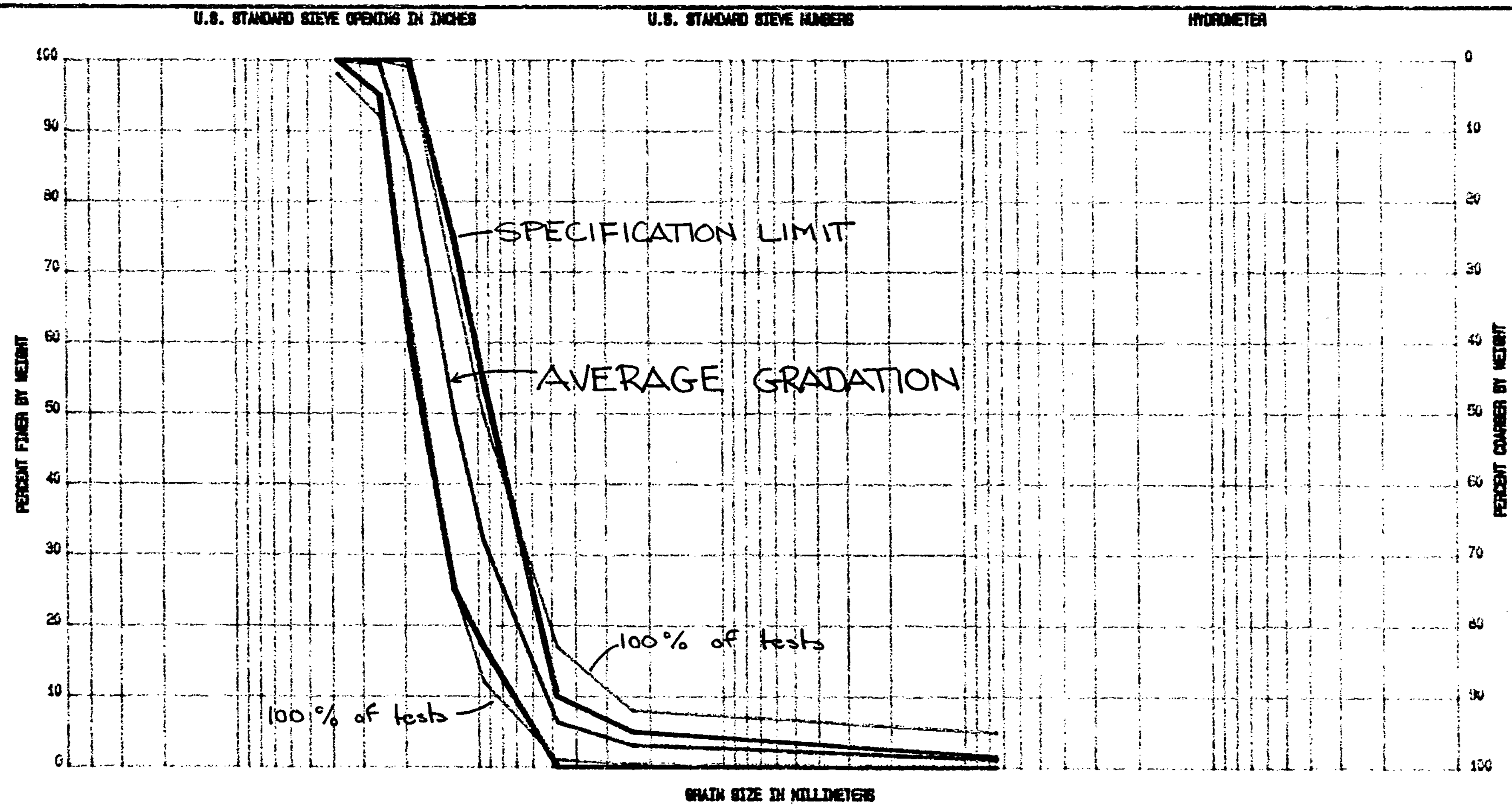
TEST NUMBER	TEST IN SPEC	STATUS FAILED TESTS	TEST COMMENTS
521A	N	RM	SOURCE-CRUSHER. GRADATION. OUT OF SPEC. REMOVED.
523	Y	RM	SOURCE-CRUSHER. GRADATION. OUT OF SPEC. REMOVED.
529	N	RM	SOURCE-HARPERS. GRADATION OUT OF SPEC. REMOVED.
533	Y		SOURCE-HARPERS. GRADATION.
538	Y		SOURCE-HARPERS. GRADATION.
541	Y		SOURCE-HARPERS. GRADATION. APPEARS TO BE SECOND LIFT.
543	Y		SOURCE-HARPERS. GRADATION.
564	Y		SOURCE-CRUSHER/HARPERS. GRADATION. BLANKET DRAIN.
565	Y		SOURCE-CRUSHER/HARPERS. GRADATION BLANKET DRAIN.
572	Y		SOURCE-CRUSHER/HARPERS. GRADATION. BOTTOM OF THE CHIMNEY DRAIN.
574	Y		SOURCE-CRUSHER/HARPERS. GRADATION.BOTTOM OF THE CHIMNEY DRAIN.
577	Y		SOURCE-CRUSHER/HARPERS. GRADATION. BLANKET DRAIN.
583	Y		SOURCE-CRUSHER/HARPERS. GRADATION. BLANKET DRAIN.
584	Y		SOURCE-CRUSHER/HARPERS. GRADATION. BLANKET DRAIN.
595	Y		SOURCE-CRUSHER/HARPERS. GRADATION. BLANKET DRAIN.
667	Y		SOURCE-RES.BORROW AREA OVERSIZE, C&S PRODUCT. GRADATION.BLANKET DRAIN. FIRST SAMPLE OF 1991.
676	Y		SOURCE-RES.BORROW AREA OVERSIZE, C&S PRODUCT. GRADATION.BLANKET DRAIN.
683	Y		SOURCE-RES. BORROW AREA OVERSIZE, C&S PRODUCT. GRADATION.BLANKET DRAIN.
690	Y		SOURCE-RES.BORROW AREA OVERSIZE, C&S PRODUCT. GRADATION.BLANKET DRAIN. PLANT CHANGED TO MAKE COARSER MATERIAL.
691	Y		SOURCE-RES.BORROW AREA OVERSIZE, C&S PRODUCT. GRADATION.BLANKET DRAIN.
709	N		SOURCE-RES.BORROW AREA OVERSIZE,C&S PRODUCT. GRADATION.LEFT ABUTMENT.
714	N	RM	SOURCE-RES.BORROW AREA OVERSIZE,C&S PRODUCT. GRADATION.BLANKET DRAIN. MATERIAL REPLACED,SEE TEST 714A.
732	N		SOURCE-RES.BORROW AREA OVERSIZE,C&S PRODUCT. GRADATION.BLANKET DRAIN.
714A	Y		SOURCE-RES.BORROW AREA OVERSIZE,C&S PRODUCT. GRADATION.BLANKET DRAIN.
735	N		SOURCE-RES.BORROW AREA OVERSIZE,C&S PRODUCT. GRADATION.BLANKET DRAIN.
756	N		SOURCE-RES.BORROW AREA OVERSIZE,C&S PRODUCT. GRADATION.BLANKET DRAIN. MATERIAL APPEARED DIRTY.
771	Y		SOURCE-RES.BORROW AREA OVERSIZE,C&S PRODUCT. GRADATION.BLANKET DRAIN.
775	N		SOURCE-RES.BORROW AREA OVERSIZE,C&S PRODUCT. GRADATION.BLANKET DRAIN. MATERIAL APPEARED DIRTY.
787	Y		SOURCE-RES.BORROW AREA OVERSIZE,C&S PRODUCT. GRADATION.BLANKET DRAIN.
791	N		SOURCE-RES.BORROW AREA OVERSIZE,C&S PRODUCT. GRADATION.LEFT ABUTMENT.
798	Y		SOURCE-RES.BORROW AREA OVERSIZE,C&S PRODUCT. GRADATION.LEFT ABUTMENT.
813	Y		SOURCE-RES.BORROW AREA OVERSIZE,C&S PRODUCT. GRADATION.RIGHT ABUTMENT.
814	Y		SOURCE-RES.BORROW AREA OVERSIZE,C&S PRODUCT. GRADATION.LEFT ABUTMENT.
822	Y		SOURCE-RES.BORROW AREA OVERSIZE,C&S PRODUCT. GRADATION.RIGHT ABUTMENT.
832	Y		SOURCE-RES.BORROW AREA OVERSIZE,C&S PRODUCT. GRADATION.LEFT ABUTMENT.
836	Y		SOURCE-RES.BORROW AREA OVERSIZE,C&S PRODUCT. GRADATION.RIGHT ABUTMENT.
858	Y		SOURCE-RES.BORROW AREA OVERSIZE,C&S PRODUCT. GRADATION.LEFT ABUTMENT.
877	Y		SOURCE-RES.BORROW AREA OVERSIZE. GRADATION. LEFT ABUTMENT.
914	N		SOURCE-NOT SPECIFIC. GRADATION ONLY. RIGHT ABUTMENT.
968	Y		SOURCE-CRUSHER/HARPERS. GRADATION ONLY. LEFT ABUTMENT.
990	N		SOURCE-NOT SPECIFIC. GRADATION ONLY. LEFT ABUTMENT.
1034	Y		SOURCE-NOT SPECIFIC. GRADATION ONLY. RIGHT ABUTMENT.
1081	N		SOURCE-CRUSHER/ . GRADATION ONLY. LEFT ABUTMENT.

TEST NUMBER	TEST IN SPEC	STATUS FAILED TESTS	TEST COMMENTS
1115	N		SOURCE-NOT STATED. GRADATION ONLY. RIGHT ABUTMENT.
1148	Y		SOURCE-NOT SPECIFIC. GRADATION ONLY. RIGHT ABUTMENT.
1261	Y		SOURCE-NOT SPECIFIC. GRADATION ONLY. LEFT ABUTMENT.IR150.
1274	Y		SOURCE-NOT STATED. GRADATION ONLY. RIGHT ABUTMENT.IR150.
1307	Y		SOURCE-NOT STATED. GRADATION ONLY. RIGHT ABUTMENT. IR150.
1321	Y		SOURCE-NOT STATED. GRADATION ONLY. RIGHT ABUTMENT.
1340	Y		SOURCE-NOT SPECIFIC. GRADATION ONLY. RIGHT ABUTMENT.
1371	Y		SOURCE-NOT SPECIFIC. GRADATION ONLY. RIGHT ABUTMENT.IR150
1460	N		SOURCE-NOT STATED. GRADATION ONLY. LEFT ABUTMENT.
1482	N		SOURCE-NOT SPECIFIC. GRADATION ONLY. LEFT ABUTMENT.
1606	Y		SOURCE-NOT SPECIFIC. GRADATION ONLY. LEFT ABUTMENT.-180 TO DS TOE. FIRST TEST OF THE YEAR. BLANKET DRAIN.
1646	N		SOURCE-NOT SPECIFIC. GRADATION ONLY. RIGHT ABUTMENT DRAIN BLANKET.
1674	N		SOURCE-NOT SPECIFIC. GRADATION ONLY. LEFT ABUTMENT DRAIN BLANKET. SLIGHTLY OUT OF SPEC. ON THE FINE SIDE.
1682	N		SOURCE-NOT SPECIFIC. GRADATION ONLY. FULL LIFT.
1690	N		SOURCE-NOT SPECIFIC. GRADATION ONLY. LEFT ABUTMENT DRAIN BLANKET.
1706	Y		SOURCE-NOT SPECIFIC. GRADATION ONLY. RIGHT ABUTMENT DRAIN BLANKET. AREA NOT STATED.
1737	Y		SOURCE-NOT SPECIFIC. GRADATION ONLY. RIGHT ABUTMENT DRAIN BLANKET. CHIMNEY TO -260.
1746	Y		SOURCE-NOT SPECIFIC. GRADATION ONLY. AREA 2255 TO 2300,-100 TO -250. RIGHT ABUTMENT DRAIN BLANKET.
1761	N		SOURCE-NOT SPECIFIC. GRADATION ONLY. LEFT ABUTMENT, DRAIN BLANKET. AREA NOT STATED.
1794	N		SOURCE-NOT SPECIFIC. GRADATION ONLY. RIGHT ABUTMENT DRAIN BLANKET. AREA 2300 TO 2350, -150 TO -375.
1806	Y		SOURCE-NOT SPECIFIC. GRADATION ONLY. LEFT ABUTMENT DRAIN BLANKET.
1815	N		SOURCE-NOT SPECIFIC. GRADATION ONLY. RIGHT ABUTMENT DRAIN BLANKET.
1833	Y		SOURCE-NOT SPECIFIC. GRADATION ONLY. LEFT ABUTMENT DRAIN BLANKET.
1858	Y		SOURCE-NOT SPECIFIC. GRADATION ONLY. RIGHT ABUTMENT DRAIN BLANKET.
1893	N		SOURCE-NOT SPECIFIC. GRADATION ONLY. LEFT ABUTMENT DRAIN BLANKET. CHIMNEY TO -330.
1955	Y		SOURCE-NOT SPECIFIC. GRADATION ONLY. LEFT ABUTMENT DRAIN BLANKET.
1962	Y		SOURCE-NOT SPECIFIC. GRADATION ONLY. RIGHT ABUTMENT DRAIN BLANKET.
1983	Y		SOURCE-NOT SPECIFIC. GRADATION ONLY. LEFT ABUTMENT DRAIN BLANKET.
2013	Y		SOURCE-NOT SPECIFIC. GRADATION ONLY. RIGHT ABUTMENT DRAIN BLANKET.
2025	Y		SOURCE- NOT SPECIFIC. GRADATION ONLY. RIGHT ABUTMENT DRAIN BLANKET.
2048	Y		SOURCE-NOT SPECIFIC. GRADATION ONLY. RIGHT ABUTMENT DRAIN BLANKET.
2081	N		SOURCE-NOT SPECIFIC. GRADATION ONLY. LEFT ABUTMENT DRAIN BLANKET.
2106	Y		SOURCE-NOT SPECIFIC. GRADATION ONLY. RIGHT ABUTMENT DRAIN BLANKET.
2172	Y		SOURCE-NOT SPECIFIC. GRADATION ONLY. RIGHT ABUTMENT DRAIN BLANKET.
2245	N		SOURCE-NOT SPECIFIC. GRADATION ONLY. LEFT ABUTMENT DRAIN BLANKET.
2308	Y		SOURCE-NOT SPECIFIC. GRADATION ONLY. LEFT ABUTMENT, DRAIN BLANKET.
2327	N		SOURCE-NOT SPECIFIC. GRADATION ONLY. RIGHT ABUTMENT, DRAIN BLANKET.

COMMENT: THIS REPORT COVERS THE ENTIRE CONSTRUCTION OF THE DAM.

LAB CHIEF: ____________________

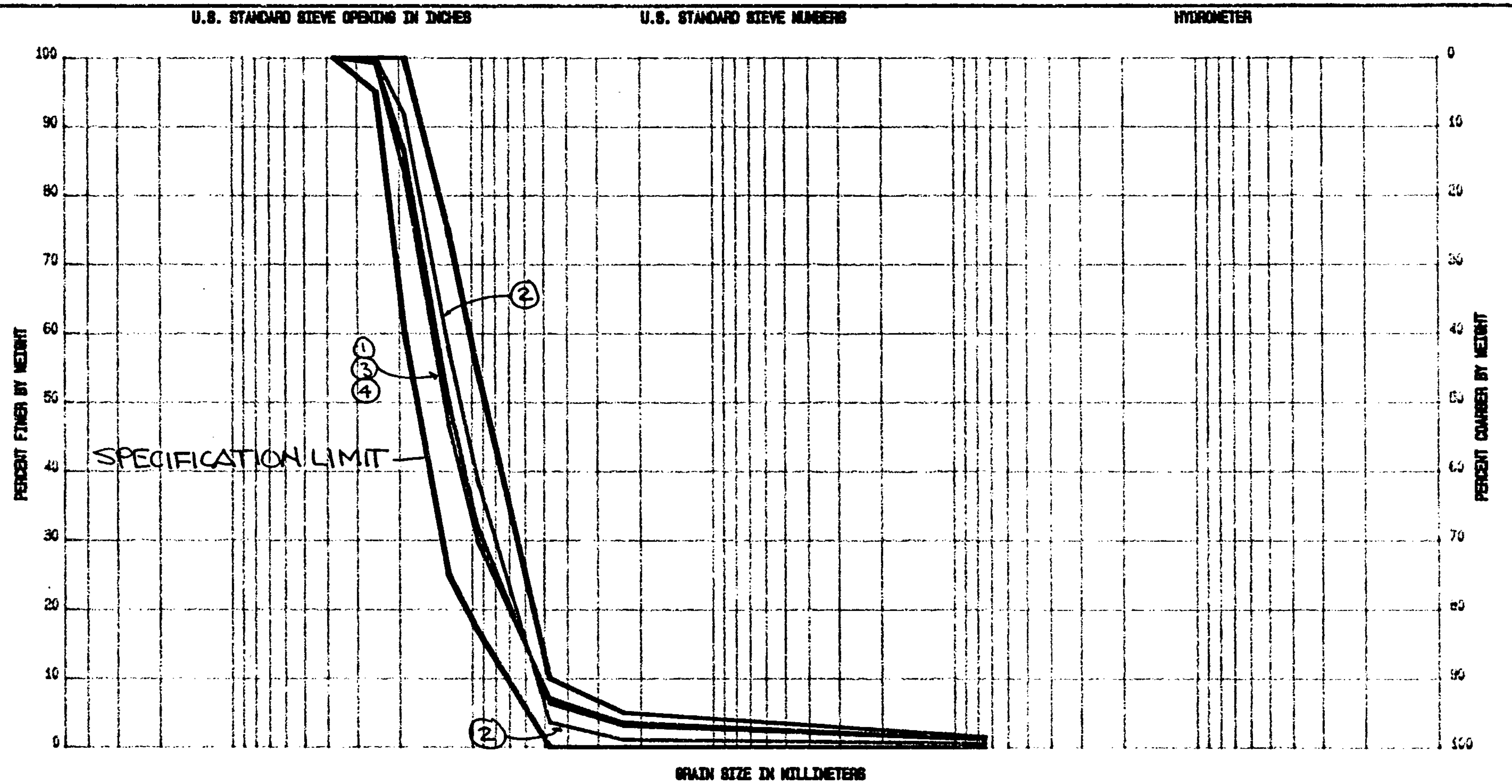
SUBMITTED BY: ____________________
PROJECT ENGINEER



Represents all test data from 1990, 1991, 1992

Project	LITTLE DELL DAM
Area	DRAIN FILL I
Boring No.	
Date	

GRADATION CURVES



1	1990. 1991. 1992
2	1990
3	1991
4	1992

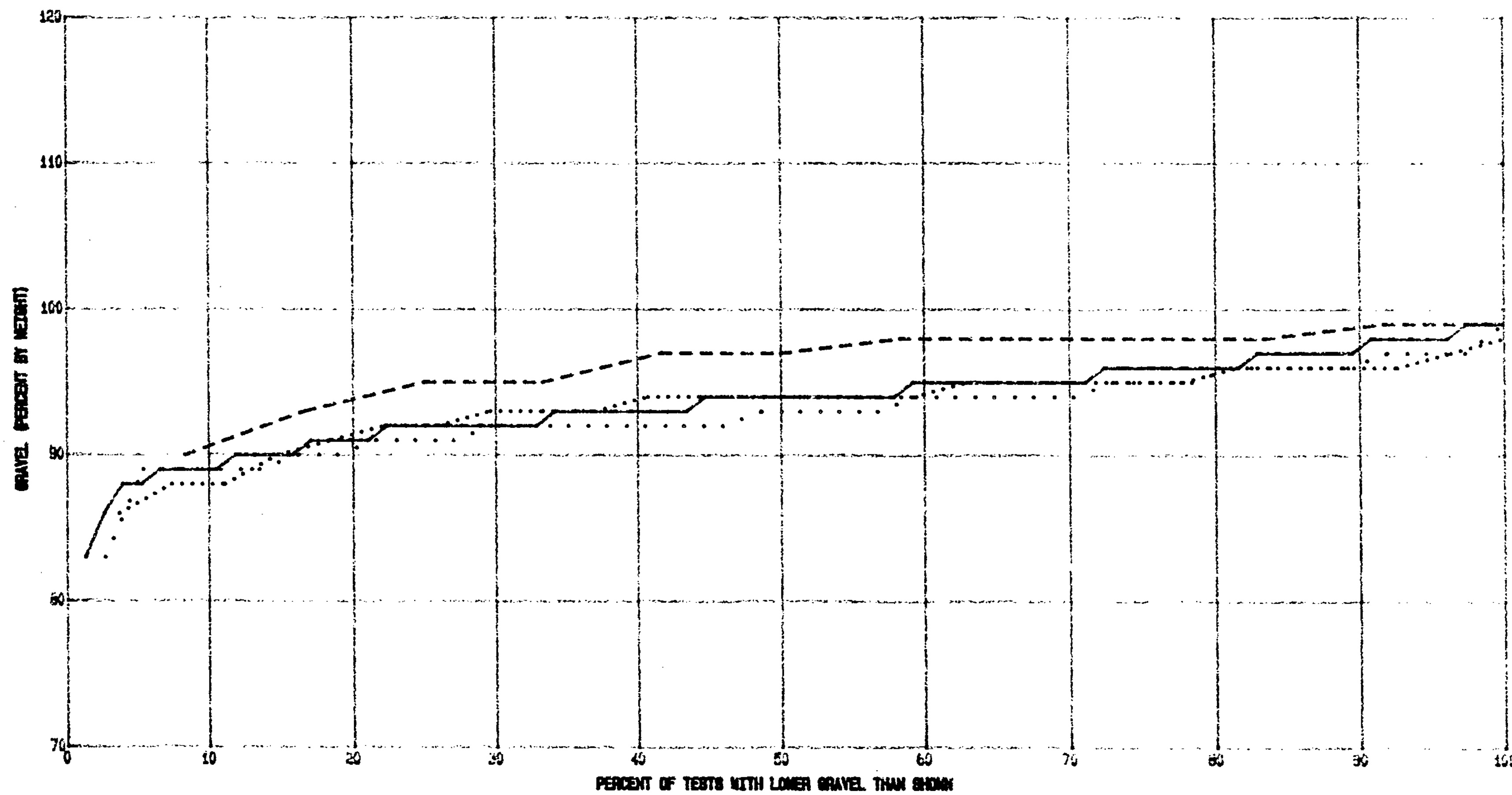
Project LITTLE DELL DAM

Area DRAIN FILL I

Boring No.

Date

AVERAGE GRADATION CURVES BY YEAR



Line Style	From Date	To Date	# Points	Mean	Std Dev	10 %	Median	90 %
	01-01-92	12-31-92	27	93.48148	2.847001	83	94	96
	01-01-91	12-31-91	37	92.89189	3.062169	89	93	96
	01-01-90	12-31-90	12	96.41666	2.712206	90	97	98
	01-01-90	12-31-92	76	93.6579	3.147709	89	94	97

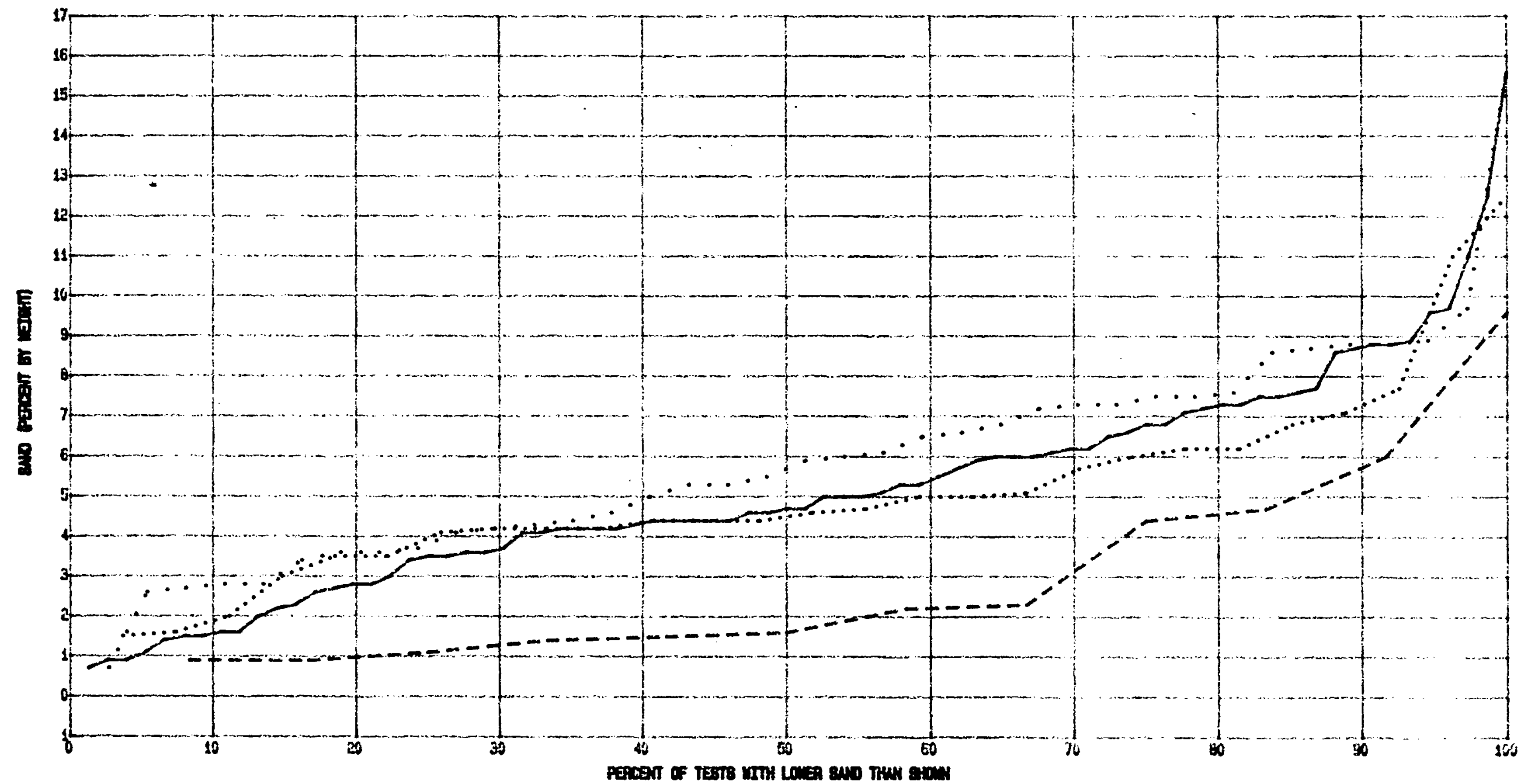
GRAVEL - S-CURVE

Project LITTLE DELL DAM

Area DRAIN FILL I

Boring No.

Date



Line Style	From Date	To Date	# Points	Mean	Std Dev	10 %	Median	90 %
....	01-01-92	12-31-92	27	5.133333	2.453099	1.6	4.4	7.1
. . . . .	01-01-91	12-31-91	37	5.945946	2.729019	2.7	5.5	8.8
— — — —	01-01-90	12-31-90	12	3.05	2.657921	.9	1.5	4.7
————	01-01-90	12-31-92	76	5.200001	2.777193	1.5	4.6	8.7

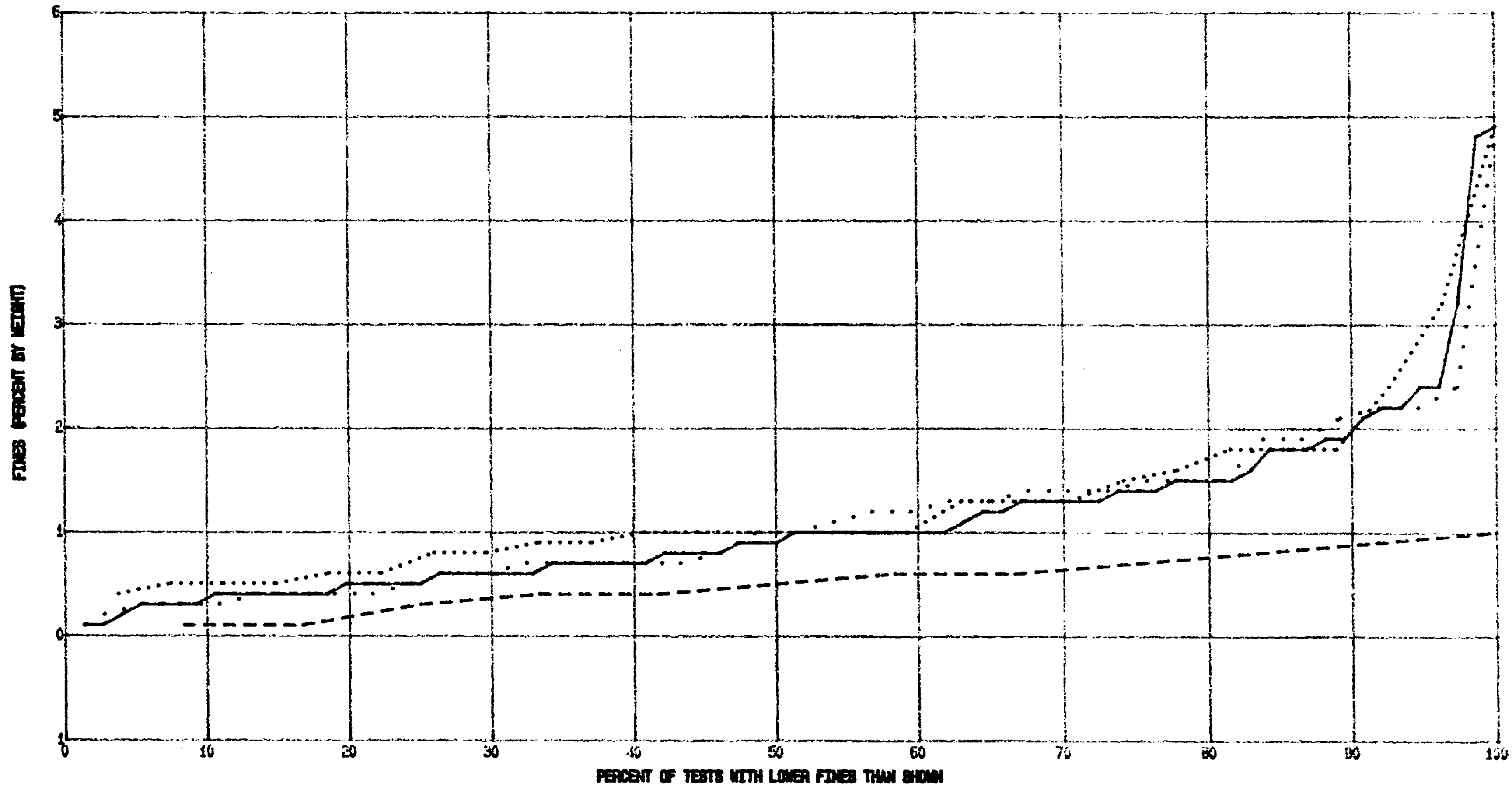
SAND - S-CURVE

Project LITTLE DELL DAM

Area DRAIN FILL I

Boring No.

Date



Line Style	From Date	To Date	# Points	Mean	Std Dev	10 %	Median	90 %
....	01-01-92	12-31-92	27	1.311111	.9582823	.5	1	1.8
. . . . .	01-01-91	12-31-91	37	1.162162	.8698781	.3	1	2.1
— — —	01-01-90	12-31-90	12	.5333334	.2802455	.1	.4	.8
———	01-01-90	12-31-92	76	1.115789	.8723896	.3	.9	1.9

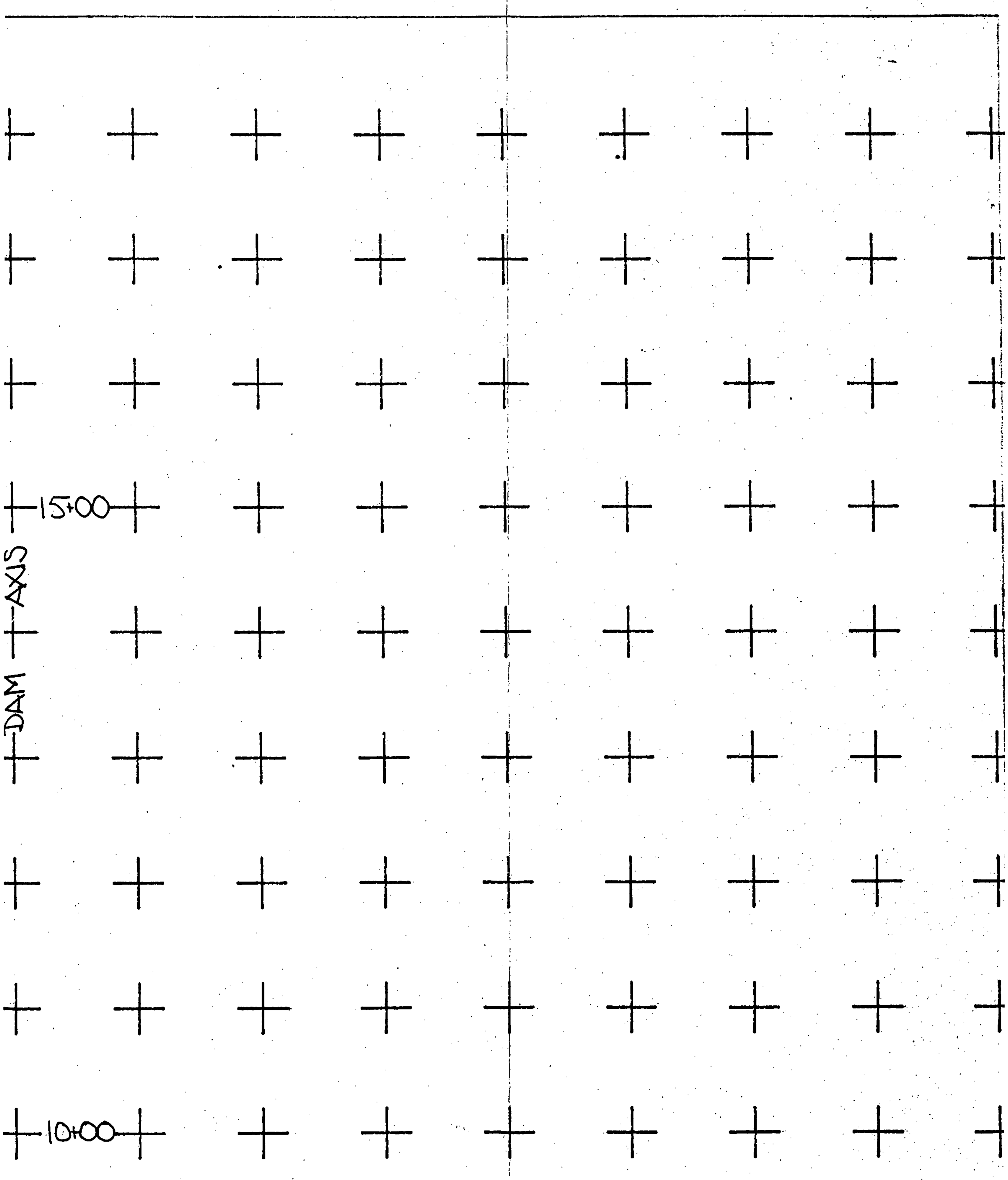
FINES - S-CURVE

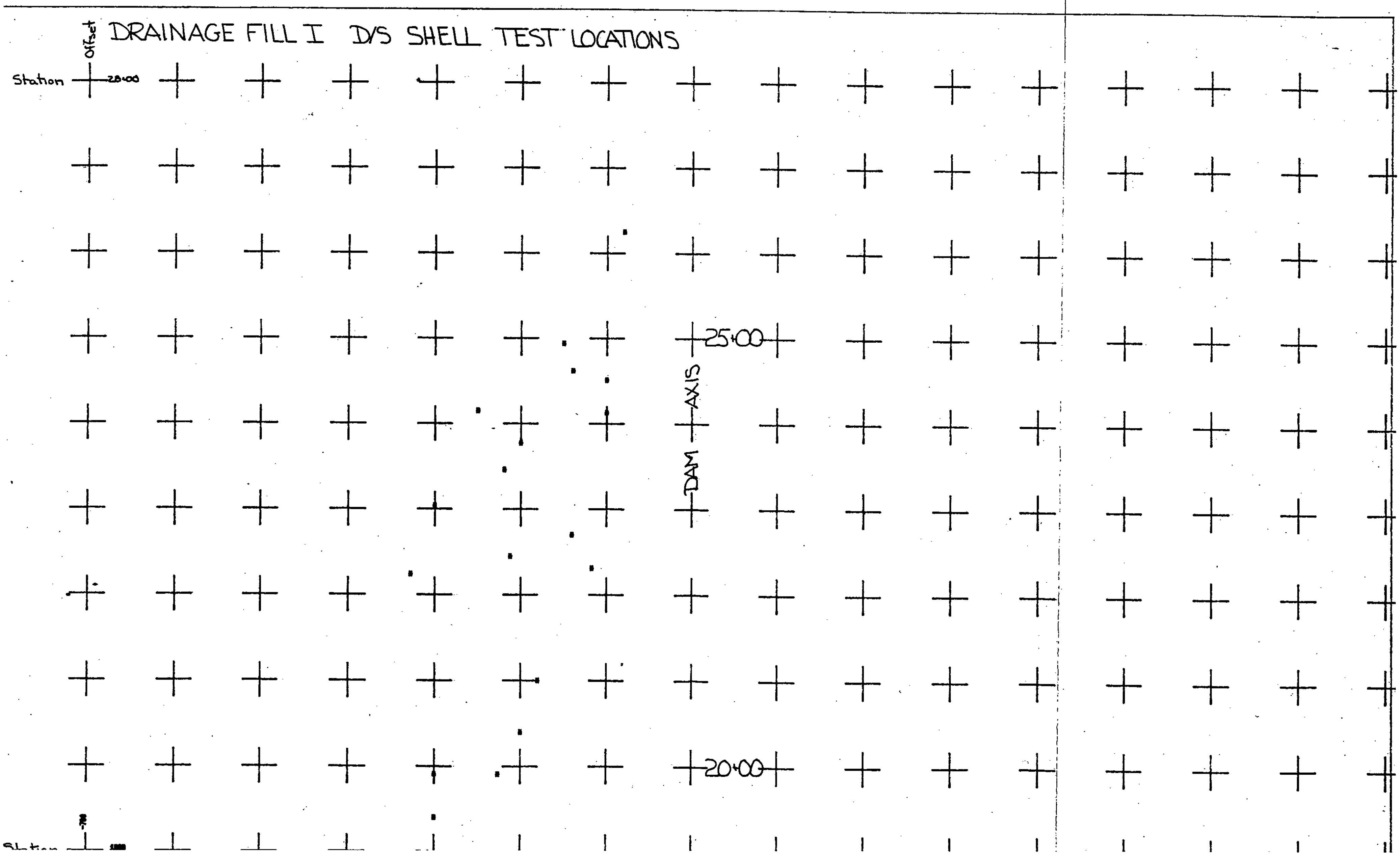
Project LITTLE DELL DAM

Area DRAIN FILL I

Boring No.

Date


15+00
DAM AXIS
10+00



DRAINAGE FILL I D/S SHELL TEST LOCATIONS
Offset
Station
DAM AXIS
25+00
20+00

APPENDIX II

FIELD CONTROL DATA, LITTLE DELL DAM

DRAIN FILL II
CHIMNEY

Specifications Comparison Report

Gradations Report

Comments Report

Gradation Curves

S Curves
- % Gravel
- % Sand

Test Locals

QUALITY ACCEPTANCE TESTING - SPECIFICATIONS COMPARISON REPORT REPORT NUMBER: DII.0

PROJECT: LITTLE DELL LAKE, DAM AND APPURTENANCES RIVER: SALT LAKE CITY STREAMS STATE: UTAH TOWN: SALT LAKE CITY	CONTRACT NO. DACW05-89-C-0045 CONTRACTOR: CLEMENT BROTHERS AND J.E. STARNES CO.	DATE OF REPORT: 12-11-92 01-01-90 THRU 12-31-92

EMBANKMENT ZONE	MIN. DESIGNED % COMP	SPEC. W.C. % RANGE	LOOSE LIFT THICK. (IN)	NUMBER OF PASSES	COMPACTION EQUIPMENT
DRAIN FILL II	50		12	2	IR SD150D

TEST NUMBER	DATE	ELEV	LOCATION STATION	LOCATION OFFSET	% COBBL	% GRAV	% SAND	% FINES	% COMPACTION DESIGN >= 50%	MOISTURE IN SPEC %- %	GRADATION IN SPEC	GRAVELS IN SPEC > %	FINES IN SPEC < %	TEST IN SPEC	STATUS FAILED TESTS
579	10-28-90	5585.0	1510	-55	0.0	91.0	9.0	0.0	-	-	Y	-	-	Y	
580	10-28-90	5586.0	1450	-52	0.0	92.0	8.0	0.0	-	-	Y	-	-	Y	
591	10-30-90	5587.0	1550	-53	0.0	94.0	6.0	0.0	-	-	Y	-	-	Y	
891	07-10-91	5590.8	1430	-65	0.0	90.0	10.0	0.0	-	-	Y	-	-	Y	
899	07-12-91	5591.6	1500	-49	0.0	94.0	6.0	0.0	-	-	Y	-	-	Y	
909	07-15-91	5593.4	1500	-50	0.0	92.0	8.0	0.0	-	-	Y	-	-	Y	
917	07-16-91	5591.8	1575	-48	0.0	93.0	7.0	0.0	-	-	Y	-	-	Y	
921	07-17-91	5595.6	1400	-52	0.0	97.0	3.0	0.0	-	-	Y	-	-	Y	
931	07-18-91	5596.1	1550	-48	0.0	93.0	7.0	0.0	-	-	Y	-	-	Y	
967	07-26-91	5602.7	1470	-50	0.0	94.0	6.0	0.0	-	-	Y	-	-	Y	
1001	08-01-91	5612.9	1700	-50	0.0	96.0	4.0	0.0	-	-	Y	-	-	Y	
1032	08-07-91	5617.5	1625	-38	0.0	96.0	4.0	0.0	-	-	Y	-	-	Y	
1076	08-12-91	5626.1	1550	-47	0.0	97.0	3.0	0.0	-	-	Y	-	-	Y	
1088	08-14-91	5628.0	1800	-52	0.0	98.0	2.0	0.0	-	-	N	-	-	N	
1114	08-18-91	5632.5	1670	-32	0.0	98.0	2.0	0.0	-	-	N	-	-	N	
1139	08-21-91	5635.9	1800	-42	0.0	98.0	2.0	0.0	-	-	Y	-	-	Y	
1251	08-31-91	5635.0	1550	-40	0.0	94.1	5.9	0.0	-	-	Y	-	-	Y	
1255	09-01-91	5637.0	2000	-40	0.0	96.0	4.0	0.0	-	-	Y	-	-	Y	
1276	09-05-91	5644.8	1550	-42	0.0	97.0	3.0	0.0	-	-	Y	-	-	Y	
1311	09-18-91	5647.5	1865	-36	0.0	96.0	4.0	0.0	-	-	Y	-	-	Y	
1322	09-20-91	5648.3	2000	-40	0.0	94.0	6.0	0.0	-	-	Y	-	-	Y	
1341	09-23-91	5651.9	1825	-37	0.0	94.0	6.0	0.0	-	-	Y	-	-	Y	
1355	09-26-91	5655.0	1675	-35	0.0	96.0	4.0	0.0	-	-	Y	-	-	Y	
1367	09-30-91	5658.1	1578	-39	0.0	91.0	9.0	0.0	-	-	Y	-	-	Y	
1469	10-14-91	5667.6	1800	-36	0.0	95.0	5.0	0.0	-	-	Y	-	-	Y	
1495	10-20-91	5669.7	1988	-35	0.0	89.0	11.0	0.0	-	-	Y	-	-	Y	
1605	04-11-92	5669.6	1470	-38	0.0	95.0	5.0	0.0	-	-	Y	-	-	Y	
1628	04-17-92	5672.4	1871	-36	0.0	90.0	10.0	0.0	-	-	Y	-	-	Y	
1638	04-25-92	5673.4	2019	-36	0.0	93.0	7.0	0.0	-	-	Y	-	-	Y	
1684	05-02-92	5677.4	1422	-38	0.0	91.0	9.0	0.0	-	-	N	-	-	N	
1693	05-05-92	5682.1	2097	-34	0.0	94.0	6.0	0.0	-	-	Y	-	-	Y	
1718	05-14-92	5681.8	1393	-36	0.0	98.0	2.0	0.0	-	-	N	-	-	N	
1725	05-15-92	5685.0	2205	-37	0.0	96.0	4.0	0.0	-	-	Y	-	-	Y	
1754	05-27-92	5689.8	2104	-37	0.0	94.0	6.0	0.0	-	-	Y	-	-	Y	
1774	05-30-92	5689.0	1550	-37	0.0	97.0	3.0	0.0	-	-	Y	-	-	Y	
1807	06-05-92	5691.7	1284	-33	0.0	93.0	7.0	0.0	-	-	Y	-	-	Y	
1846	06-12-92	5698.6	2279	-34	0.0	95.0	5.0	0.0	-	-	Y	-	-	Y	
1855	06-19-92	5698.8	1328	-33	0.0	93.0	7.0	0.0	-	-	Y	-	-	Y	
1860	06-19-92	5701.1	2369	-35	0.0	92.0	8.0	0.0	-	-	Y	-	-	Y	
1874	06-23-92	5703.5	2050	-35	0.0	96.0	4.0	0.0	-	-	Y	-	-	Y	
1937	07-03-92	5710.0	1415	-36	0.0	92.0	8.0	0.0	-	-	Y	-	-	Y	
2002	07-18-92	5717.0	1280	-36	0.0	93.0	7.0	0.0	-	-	Y	-	-	Y	
2100	08-03-92	5733.2	1318	-32	0.0	96.0	4.0	0.0	-	-	Y	-	-	Y	

QUALITY ACCEPTANCE TESTING - SPECIFICATIONS COMPARISON REPORT   REPORT NUMBER: DII.0

TEST NUMBER	DATE	ELEV	LOCATION STATION	LOCATION OFFSET	% COBBL	% GRAV	% SAND	% FINES	% COMPACTION DESIGN >= 50%	MOISTURE IN SPEC %- %	GRADATION IN SPEC	GRAVELS IN SPEC > %	FINES IN SPEC < %	TEST IN SPEC	STATUS FAILED TESTS
2115	08-05-92	5736.6	2050	-33	0.0	97.0	3.0	0.0	-	-	Y	-	-	Y	
2161	08-13-92	5743.3	1750	-31	0.0	97.0	3.0	0.0	-	-	Y	-	-	Y	
2173	08-14-92	5744.0	1450	-33	0.0	85.0	15.0	0.0	-	-	Y	-	-	Y	
2192	08-18-92	5748.9	1450	-32	0.0	88.0	12.0	0.0	-	-	Y	-	-	Y	
2213	08-22-92	5752.7	2311	-32	0.0	92.0	8.0	0.0	-	-	Y	-	-	Y	
2249	08-28-92	5758.6	2435	-24	0.0	96.0	4.0	0.0	-	-	N	-	-	N	
2265	09-02-92	5763.4	1226	-29	0.0	98.0	2.0	0.0	-	-	Y	-	-	Y	
2284	09-09-92	5769.2	1890	-30	0.0	90.0	10.0	0.0	-	-	Y	-	-	Y	
2324	09-16-92	5780.9	2138	-30	0.0	94.0	6.0	0.0	-	-	Y	-	-	Y	
2336	09-18-92	5783.5	2289	-29	0.0	91.0	9.0	0.0	-	-	Y	-	-	Y	
2345	09-20-92	5786.7	2350	-26	0.0	81.0	19.0	0.0	-	-	Y	-	-	Y	
2353	09-22-92	5791.8	2252	-30	0.0	93.0	7.0	0.0	-	-	Y	-	-	Y	
2364	09-25-92	5796.6	2411	-27	0.0	96.0	4.0	0.0	-	-	Y	-	-	Y	
2368	09-25-92	5794.1	1138	-29	0.0	97.0	3.0	0.0	-	-	Y	-	-	Y	

NOTE: These statistics include only results of tests that are NOT designated as RM, RW, or RW,RT.

	% COMPACTION	MOISTURE	GRADATION	GRAVELS	FINES	TEST IN SPEC
FAILING TEST LOCATIONS	0	0	5	0	0	5
PASSING TEST LOCATIONS	0	0	52	0	0	52
TOTAL TEST LOCATIONS	0	0	57	0	0	57
% FAILING TEST LOCATIONS	0.0	0.0	8.8	0.0	0.0	8.8

REMARKS LEGEND

RM - Test Location Removed
RW - Test Loc. Reworked and NOT Retested
RW,RT - Test Loc. Reworked and Retested
AR - Additional Rolling at Test Location

TEST LOCATIONS REWORKED - UNTESTED..	0
TEST LOCATIONS REWORKED - RETESTED..	0
TEST LOCATIONS REMOVED.............	0
FAILED TEST LOCATIONS NOT REWORKED OR RETESTED..	5
PERCENT OF FAILED TEST LOCATIONS NOT REWORKED OR RETESTED IN PERMANENT FILL..	8.8

COMMENT: THIS REPORT COVERS THE ENTIRE CONSTRUCTION OF THE DAM.

LAB CHIEF: ______________________

SUBMITTED BY: ______________________
PROJECT ENGINEER

QUALITY ACCEPTANCE TESTING - GRADATIONS REPORT	REPORT NUMBER: DII.1	PAGE 1 OF 2

PROJECT: LITTLE DELL LAKE, DAM AND APPURTENANCES RIVER: SALT LAKE CITY STREAMS STATE: UTAH TOWN: SALT LAKE CITY	CONTRACT NO. DACW05-89-C-0045 CONTRACTOR: CLEMENT BROTHERS AND J.E. STARNES CO.	DATE OF REPORT: 12-11-92 01-01-90 THRU 12-31-92

EMBANKMENT ZONE	MIN. DESIGNED % COMP	SPEC. W.C. % RANGE	LOOSE LIFT THICK. (IN)	NUMBER OF PASSES	COMPACTION EQUIPMENT
DRAIN FILL II	50		12	2	IR SD1500

TEST NUMBER	DATE	ELEV	LOCATION		GRADATION - PERCENT PASSING										LL	PI	CLASSIFICATION
			STATION	OFFSET	4 IN	1.5IN	3/4IN	3/8IN	# 4	# 8	# 16						
579	10-28-90	5585.0	1510	-55	100.0	100.0	92.0	46.0	9.0	1.2	.7						GP
580	10-28-90	5586.0	1450	-52	100.0	100.0	92.0	40.0	8.0	2.0	1.6						GP
591	10-30-90	5587.0	1550	-53	100.0	100.0	91.0	30.0	6.0	2.0	1.3						GP
891	07-10-91	5590.8	1430	-65	100.0	100.0	88.0	38.0	10.0	5.0	3.0						GP
899	07-12-91	5591.6	1500	-49	100.0	100.0	87.0	31.0	6.0	3.0	2.0						GP
909	07-15-91	5593.4	1500	-50	100.0	100.0	83.0	30.0	8.0	4.0	3.0						GP
917	07-16-91	5591.8	1575	-48	100.0	100.0	85.0	31.0	7.0	4.0	2.0						GP
921	07-17-91	5595.6	1400	-52	100.0	100.0	83.0	20.0	3.0	2.0	2.0						GP
931	07-18-91	5596.1	1550	-48	100.0	100.0	88.0	33.0	7.0	3.0	3.0						GP
967	07-26-91	5602.7	1470	-50	100.0	100.0	94.0	36.0	6.0	3.0	3.0						GP
1001	08-01-91	5612.9	1700	-50	100.0	100.0	84.0	22.0	4.0	2.0	2.0						GP
1032	08-07-91	5617.5	1625	-38	100.0	100.0	83.0	24.0	4.0	2.0	2.0						GP
1076	08-12-91	5626.1	1550	-47	100.0	100.0	86.0	28.0	3.0	1.0	.8						GP
1088	08-14-91	5628.0	1800	-52	100.0	100.0	71.0	***13.0***	2.0	1.0	1.0						GP
1114	08-18-91	5632.5	1670	-32	100.0	100.0	65.0	***14.0***	2.0	2.0	2.0						GP
1139	08-21-91	5635.9	1800	-42	100.0	100.0	81.0	18.0	2.0	1.0	.8						GP
1251	08-31-91	5635.0	1550	-40	100.0	100.0	90.0	31.0	5.9	3.0	2.0						GP
1255	09-01-91	5637.0	2000	-40	100.0	100.0	82.0	21.0	4.0	2.3	2.0						GP
1276	09-05-91	5644.8	1550	-42	100.0	100.0	88.0	21.0	3.0	2.0	1.0						GP
1311	09-18-91	5647.5	1865	-36	100.0	100.0	85.0	21.0	4.0	3.0	2.0						GP
1322	09-20-91	5648.3	2000	-40	100.0	100.0	86.0	36.0	6.0	2.0	2.0						GP
1341	09-23-91	5651.9	1825	-37	100.0	100.0	87.0	33.0	6.0	2.0	2.0						GP
1355	09-26-91	5655.0	1675	-35	100.0	100.0	87.0	35.0	4.0	1.0	1.0						GP
1367	09-30-91	5658.1	1578	-39	100.0	100.0	84.0	35.0	9.0	4.0	3.0						GP
1469	10-14-91	5667.6	1800	-36	100.0	100.0	94.0	45.0	5.0	2.0	1.0						GP
1495	10-20-91	5669.7	1988	-35	100.0	100.0	96.0	63.0	11.0	5.0	4.0						GP
1605	04-11-92	5669.6	1470	-38	100.0	100.0	82.0	22.0	5.0	4.0	3.4						GP
1628	04-17-92	5672.4	1871	-36	100.0	100.0	84.0	30.0	10.0	6.0	4.8						GP
1638	04-25-92	5673.4	2019	-36	100.0	100.0	78.0	21.0	7.0	4.0	4.0						GP
1684	05-02-92	5677.4	1422	-38	100.0	100.0	91.0	36.0	9.0	6.0	***6.0***						GP
1693	05-05-92	5682.1	2097	-34	100.0	100.0	88.0	32.0	6.0	4.0	3.6						GP
1718	05-14-92	5681.8	1393	-36	100.0	100.0	79.0	***12.0***	2.0	1.7	1.5						GP
1725	05-15-92	5685.0	2205	-37	100.0	100.0	87.0	29.0	4.0	2.0	2.0						GP
1754	05-27-92	5689.8	2104	-37	100.0	100.0	90.0	39.0	6.0	3.0	2.6						GP
1774	05-30-92	5689.0	1550	-37	100.0	100.0	81.0	19.0	3.0	2.0	1.7						GP
1807	06-05-92	5691.7	1284	-33	100.0	100.0	85.0	36.0	7.0	3.0	2.0						GP
1846	06-12-92	5698.6	2279	-34	100.0	100.0	88.0	35.0	5.0	2.0	1.5						GP
1855	06-19-92	5698.8	1328	-33	100.0	100.0	86.0	36.0	7.0	3.0	2.5						GP
1860	06-19-92	5701.1	2369	-35	100.0	100.0	89.0	38.0	8.0	3.0	2.0						GP
1874	06-23-92	5703.5	2050	-35	100.0	100.0	81.0	25.0	4.0	2.0	1.0						GP
1937	07-03-92	5710.0	1415	-36	100.0	100.0	89.0	45.0	8.0	4.0	3.0						GP
2002	07-18-92	5717.0	1280	-36	100.0	100.0	87.0	46.0	7.0	2.0	1.7						GP
2100	08-03-92	5733.2	1318	-32	100.0	100.0	86.0	37.0	4.0	2.0	1.0						GP

QUALITY ACCEPTANCE TESTING - GRADATIONS REPORT										REPORT NUMBER: DII.1							PAGE 2 OF 2
TEST NUMBER	DATE	ELEV	LOCATION		GRADATION - PERCENT PASSING										LL	PI	CLASSIFICATION
			STATION	OFFSET	4 IN	1.5IN	3/4IN	3/8IN	# 4	# 8	# 16						
2115	08-05-92	5736.6	2050	-33	100.0	100.0	88.0	23.0	3.0	1.5	1.3						GP
2161	08-13-92	5743.3	1750	-31	100.0	100.0	90.0	16.0	3.0	2.0	1.2						GP
2173	08-14-92	5744.0	1450	-33	100.0	100.0	84.0	39.0	15.0	6.0	4.0						GP
2192	08-18-92	5748.9	1450	-32	100.0	100.0	86.0	33.0	12.0	5.0	4.0						GP
2213	08-22-92	5752.7	2311	-32	100.0	100.0	86.0	27.0	8.0	4.0	3.0						GP
2249	08-28-92	5758.6	2435	-24	100.0	100.0	82.0	***14.0***	4.0	3.0	2.0						GP
2265	09-02-92	5763.4	1226	-29	100.0	100.0	84.0	21.0	2.0	1.5	1.0						GP
2284	09-09-92	5769.2	1890	-30	100.0	100.0	91.0	27.0	10.0	5.0	4.0						GP
2324	09-16-92	5780.9	2138	-30	100.0	100.0	95.0	30.0	6.0	3.0	2.0						GP
2336	09-18-92	5783.5	2289	-29	100.0	100.0	88.0	30.0	9.0	5.0	4.0						GP
2345	09-20-92	5786.7	2350	-26	100.0	100.0	86.0	43.0	19.0	8.0	4.0						GP
2353	09-22-92	5791.8	2252	-30	100.0	100.0	90.0	26.0	7.0	4.0	3.0						GP
2364	09-25-92	5796.6	2411	-27	100.0	100.0	81.0	27.0	4.0	3.0	2.0						GP
2368	09-25-92	5794.1	1138	-29	100.0	100.0	85.0	27.0	3.0	1.5	1.0						GP

NOTE - Emphasized Numbers indicate percent passing outside of gradation range specified.

COMMENT: THIS REPORT COVERS THE ENTIRE CONSTRUCTION OF THE DAM.

LAB CHIEF: ____________________

SUBMITTED BY: ____________________
PROJECT ENGINEER

QUALITY ACCEPTANCE TESTING - COMMENTS REPORT	REPORT NUMBER: DII.2	PAGE 1 OF 2
PROJECT: LITTLE DELL LAKE, DAM AND APPURTENANCES RIVER: SALT LAKE CITY STREAMS STATE: UTAH TOWN: SALT LAKE CITY	CONTRACT NO. DACW05-89-C-0045 CONTRACTOR: CLEMENT BROTHERS AND J.E. STARNES CO.	DATE OF REPORT: 12-11-92 01-01-90 THRU 12-31-92

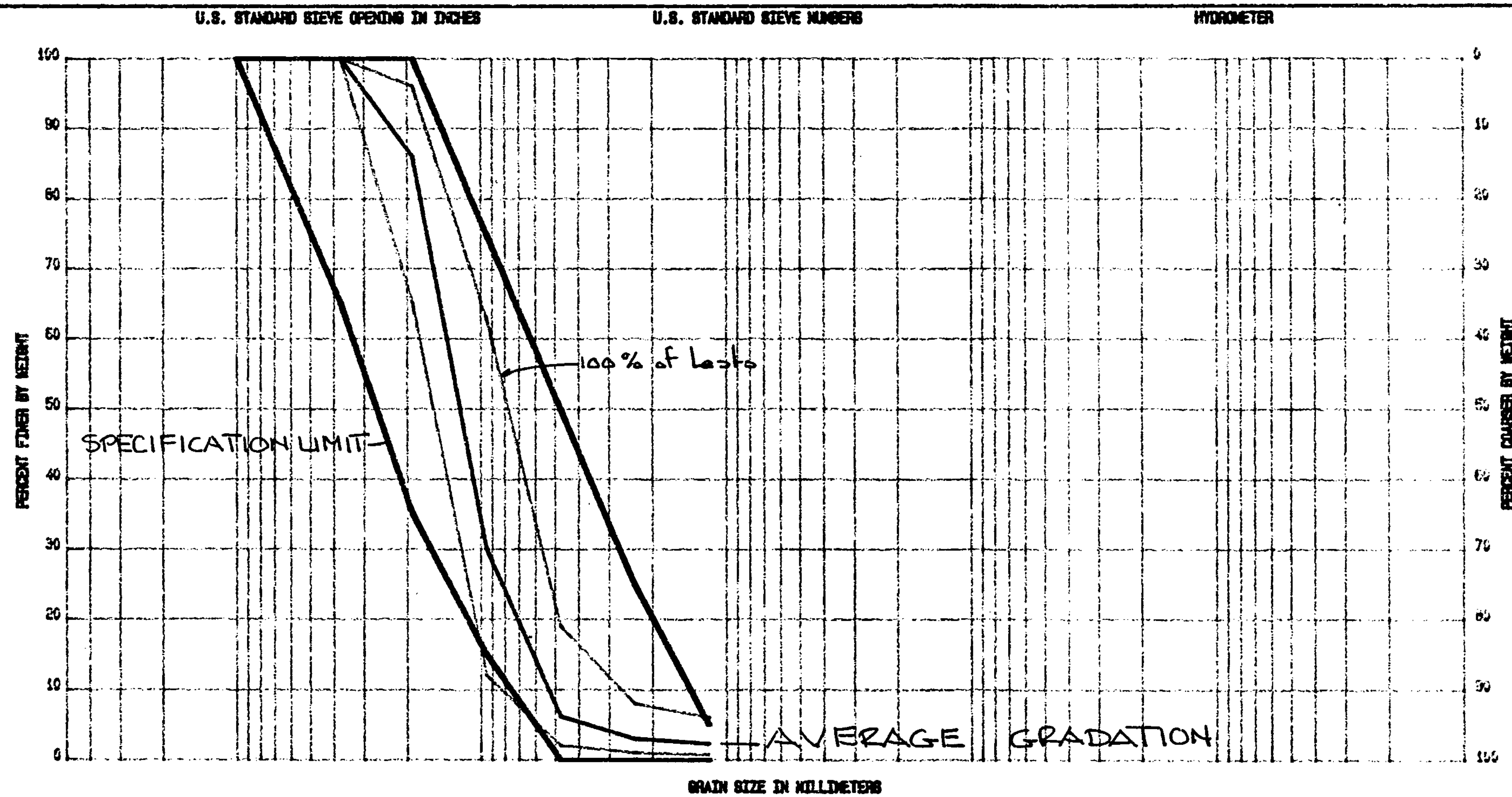
EMBANKMENT ZONE	MIN. DESIGNED % COMP	SPEC. W.C. % RANGE	LOOSE LIFT THICK. (IN)	NUMBER OF PASSES	COMPACTION EQUIPMENT
DRAIN FILL II	50	999 TO 999	12	2	IR SD1500

TEST NUMBER	TEST IN SPEC	STATUS FAILED TESTS	TEST COMMENTS
579	Y		SOURCE-CRUSHER/HARPERS. GRADATION. CHIMNEY DRAIN.
580	Y		SOURCE-CRUSHER/HARPERS. GRADATION. CHIMNEY DRAIN.
591	Y		SOURCE-CRUSHER/HARPERS. GRADATION. CHIMNEY DRAIN.
891	Y		SOURCE-RES.BORROW AREA OVERSIZE. GRADATION. SAME MATERIAL AS DFI. FIRST CHIMNEY PLACEMENT THIS YEAR.
899	Y		SOURCE-RES.BORROW AREA OVERSIZE. GRADATION. CHIMNEY.
909	Y		SOURCE-NOT SPECIFIC. GRADATION ONLY. CHIMNEY.
917	Y		SOURCE-NOT SPECIFIC. GRADATION ONLY. CHIMNEY.
921	Y		SOURCE-NOT SPECIFIC. GRADATION ONLY. CHIMNEY.
931	Y		SOURCE-NOT SPECIFIC. GRADATION ONLY. CHIMNEY.
967	Y		SOURCE-CRUSHER/HARPERS. GRADATION ONLY. IR150D
1001	Y		SOURCE-CRUSHER. GRADATIION ONLY. IR150D. CHIMNEY.
1032	Y		SOURCE-CRUSHER PLANT. GRADATIOIN ONLY. IR150.
1076	Y		SOURCE-NOT SPECIFIC. GRADATION ONLY. CHIMNEY.
1088	N		SOURCE-CRUSHER. GRADATION ONLY. CHIMNEY. IR150.
1114	N		SOURCE-NOT SPECIFIC. GRADATION ONLY. CHIMNEY.
1139	Y		SOURCE-NOT SPECIFIC. GRADATION ONLY. CHIMNEY.
1251	Y		SOURCE-NOT SPECIFIC. GRADATION ONLY. CHIMNEY.
1255	Y		SOURCE-NOT SPECIFIC. GRADATION ONLY. CHIMNEY.
1276	Y		SOURCE-NOT STATED. GRADATION ONLY. CHIMNEY.
1311	Y		SOURCE-NOT STATED. GRADATION ONLY. CHIMNEY.
1322	Y		SOURCE-NOT STATED. GRADATION ONLY. CHIMNEY.
1341	Y		SOURCE-NOT SPECIFIC. GRADATION ONLY. CHIMNEY. IR150.
1355	Y		SOURCE-NOT SPECIFIC. GRADATION ONLY. CHIMNEY. IR150
1367	Y		SOURCE-NOT SPECIFIC. GRADATION ONLY. CHIMNEY. IR150.
1469	Y		SOURCE-NOT SPECIFIC. GRADATION ONLY. CHIMNEY.
1495	Y		SOURCE-NOT SPECIFIC. GRADATION ONLY. MATERIAL APPEARED DIRTY. SEE ALSO 1496. ONLY 2.2% FINES. CHIMNEY.
1605	Y		SOURCE-NOT SPECIFIC. GRADATION ONLY. CHIMNEY.FIRST TEST OF THE YEAR.
1628	Y		SOURCE-NOT SPECIFIC. GRADATION ONLY. CHIMNEY.
1638	Y		SOURCE-NOT SPECIFIC. GRADATION ONLY. AREA 1550 TO 2100.CHIMNEY.
1684	N		SOURCE-NOT SPECIFIC. GRADATION ONLY. CHIMNEY.
1693	Y		SOURCE-NOT SPECIFIC. GRADATION ONLY. CHIMNEY.
1718	N		SOURCE-NOT SPECIFIC. GRADATION ONLY. CHIMNEY.
1725	Y		SOURCE-NOT SPECIFIC. GRADATION ONLY. CHIMNEY.
1754	Y		SOURCE-NOT SPECIFIC. GRADATION ONLY. CHIMNEY. AREA 1950 TO 2225.
1774	Y		SOURCE-NOT SPECIFIC. GRADATION ONLY. CHIMNEY. AREA 1300 TO 1950.
1807	Y		SOURCE-NOT SPECIFIC. GRADATION ONLY. CHIMNEY.
1846	Y		SOURCE-CRUSHER. GRADATION ONLY. CHIMNEY. AREA 1225 TO 2400.
1855	Y		SOURCE-NOT SPECIFIC. GRADATION ONLY. CHIMNEY. AREA LA TO 1550.
1860	Y		SOURCE-NOT SPECIFIC. GRADATION ONLY. CHIMNEY. AREA 1500 TO 2375.
1874	Y		SOURCE-NOT SPECIFIC. GRADATION ONLY. CHIMNEY.
1937	Y		SOURCE-NOT SPECIFIC. GRADATION ONLY. CHIMNEY.
2002	Y		SOURCE-NOT SPECIFIC. GRADATION ONLY. CHIMNEY.
2100	Y		SOURCE-NOT SPECIFIC. GRADATION ONLY. CHIMNEY.

TEST NUMBER	TEST IN SPEC	STATUS FAILED TESTS	TEST COMMENTS
2115	Y		SOURCE-NOT SPECIFIC. GRADATION ONLY. CHIMNEY.
2161	Y		SOURCE-NOT SPECIFIC. GRADATION ONLY. CHIMNEY.
2173	Y		SOURCE-AJ DEAN. GRADATION ONLY. CHIMNEY.
2192	Y		SOURCE-AJ DEAN. GRADATION ONLY. CHIMNEY.
2213	Y		SOURCE-AJ DEAN. GRADATION ONLY. CHIMNEY.
2249	N		SOURCE-NOT STATED. GRADATION ONLY. CHIMNEY.
2265	Y		SOURCE-NOT SPECIFIC. GRADATION ONLY. CHIMNEY.
2284	Y		SOURCE-NOT STATED. GRADATION ONLY. CHIMNEY.
2324	Y		SOURCE-NOT SPECIFIC. GRADATION ONLY. CHIMNEY.
2336	Y		SOURCE-NOT SPECIFIC. GRADATION ONLY. CHIMNEY.
2345	Y		SOURCE-OFF SITE NOT STATED. GRADATION ONLY. CHIMNEY.
2353	Y		SOURCE-NOT STATED. GRADATION ONLY. CHIMNEY.
2364	Y		SOURCE-NOT STATED. GRADATION ONLY. CHIMNEY.
2368	Y		SOURCE-AJ DEAN. GRADATION ONLY. CHIMNEY.

COMMENT: THIS REPORT COVERS THE ENTIRE CONSTRUCTION OF THE DAM.

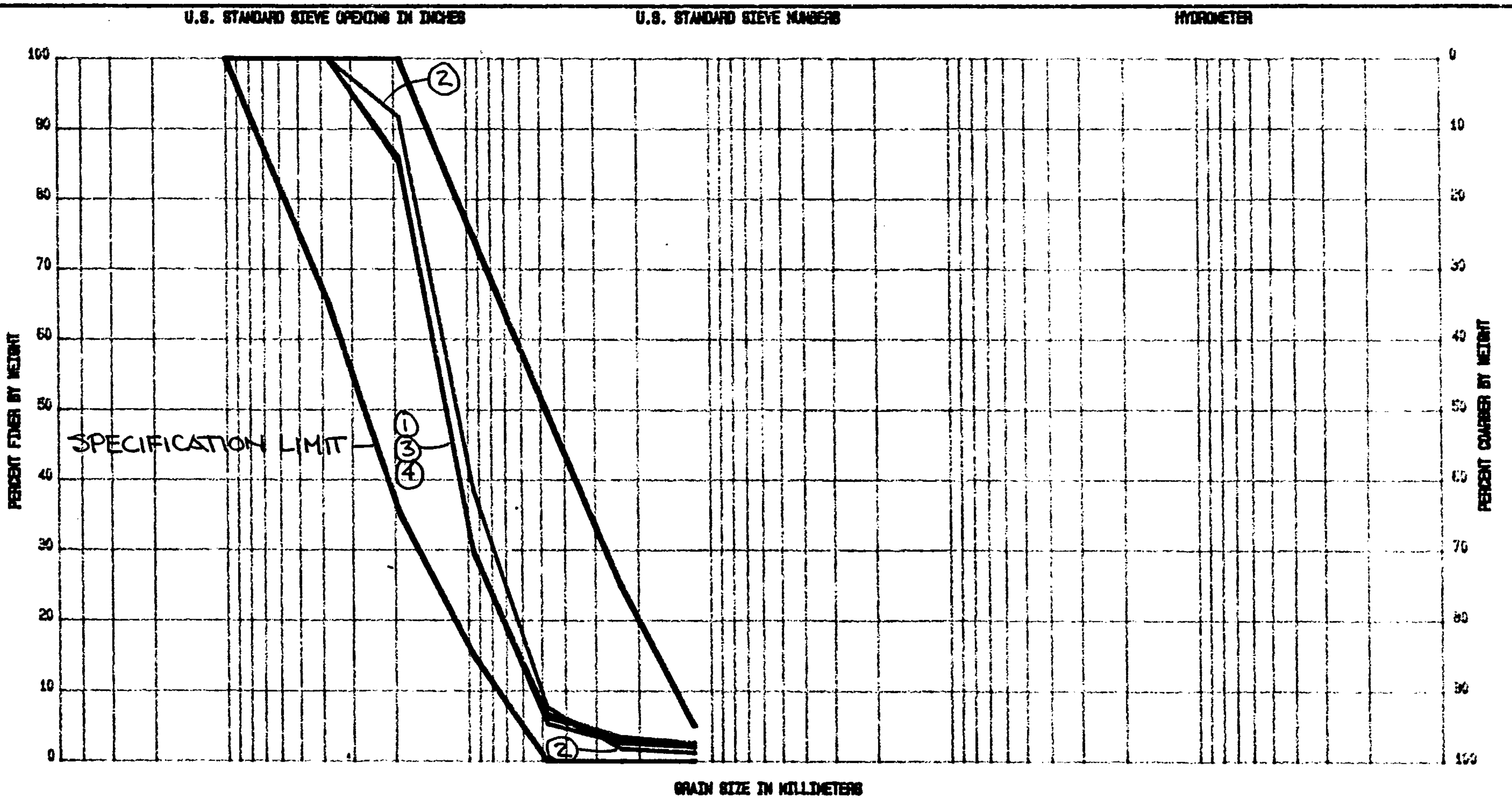
LAB CHIEF: ____________________ SUBMITTED BY: ____________________
PROJECT ENGINEER



Represents all test data from 1990, 1991, 1992

Project	LITTLE DELL DAM
Area	DRAIN FILL II
Boring No.	
Date	

GRADATION CURVES



1 1990, 1991, 1992
2 1990
3 1991
4 1992

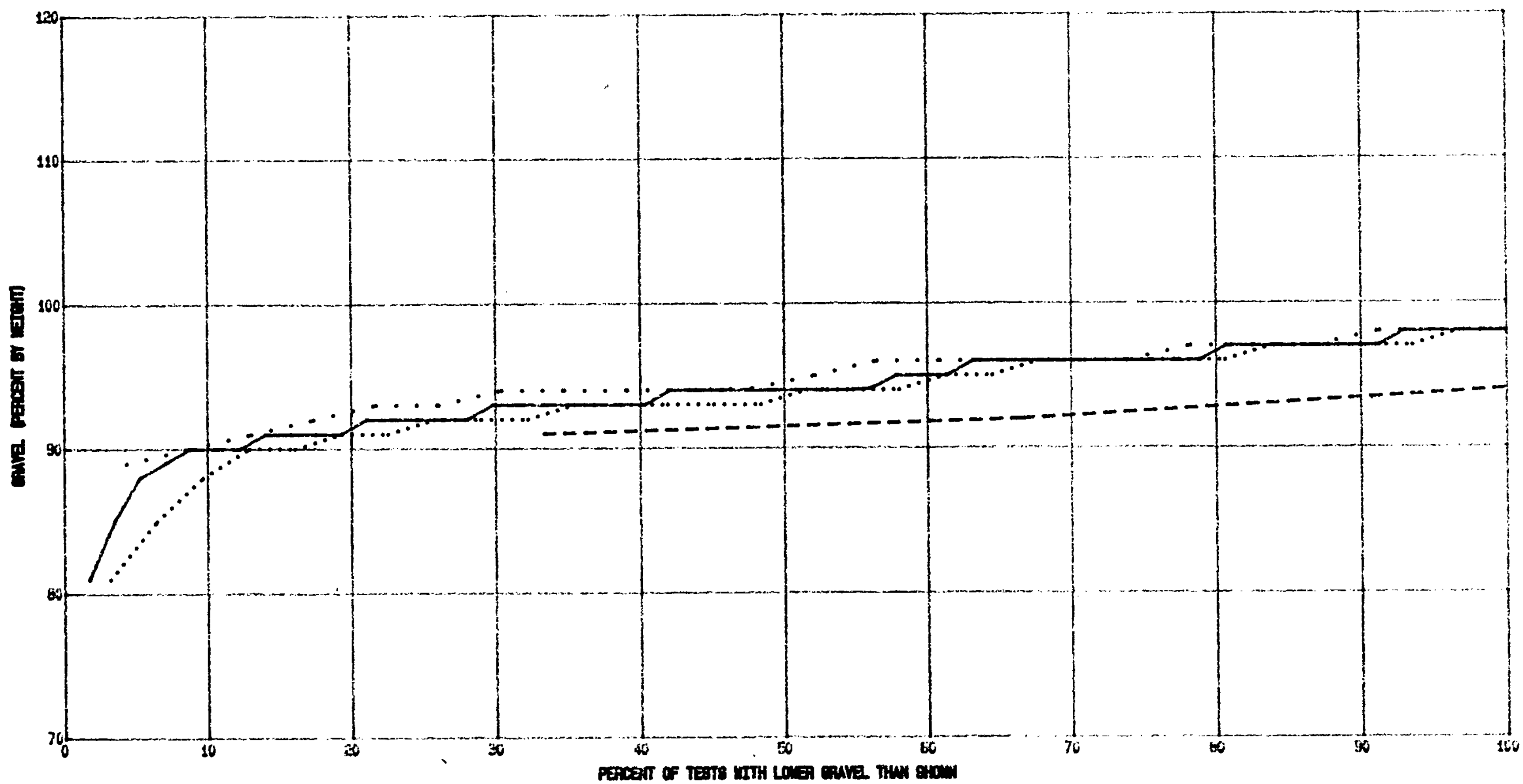
AVERAGE GRADATION CURVES BY YEAR

Project LITTLE DELL DAM

Area DRAIN FILL II

Boring No.

Date



Line Style	From Date	To Date	# Points	Mean	Std Dev	10 %	Median	90 %
···········	01-01-92	12-31-92	31	93.32258	3.780639	88	93	97
· · · · · ·	01-01-91	12-31-91	23	94.7	2.629139	90	94.1	97
– – – – –	01-01-90	12-31-90	3	92.33334	1.527525	0	91	92
———	01-01-90	12-31-92	57	93.82632	3.290339	90	94	97

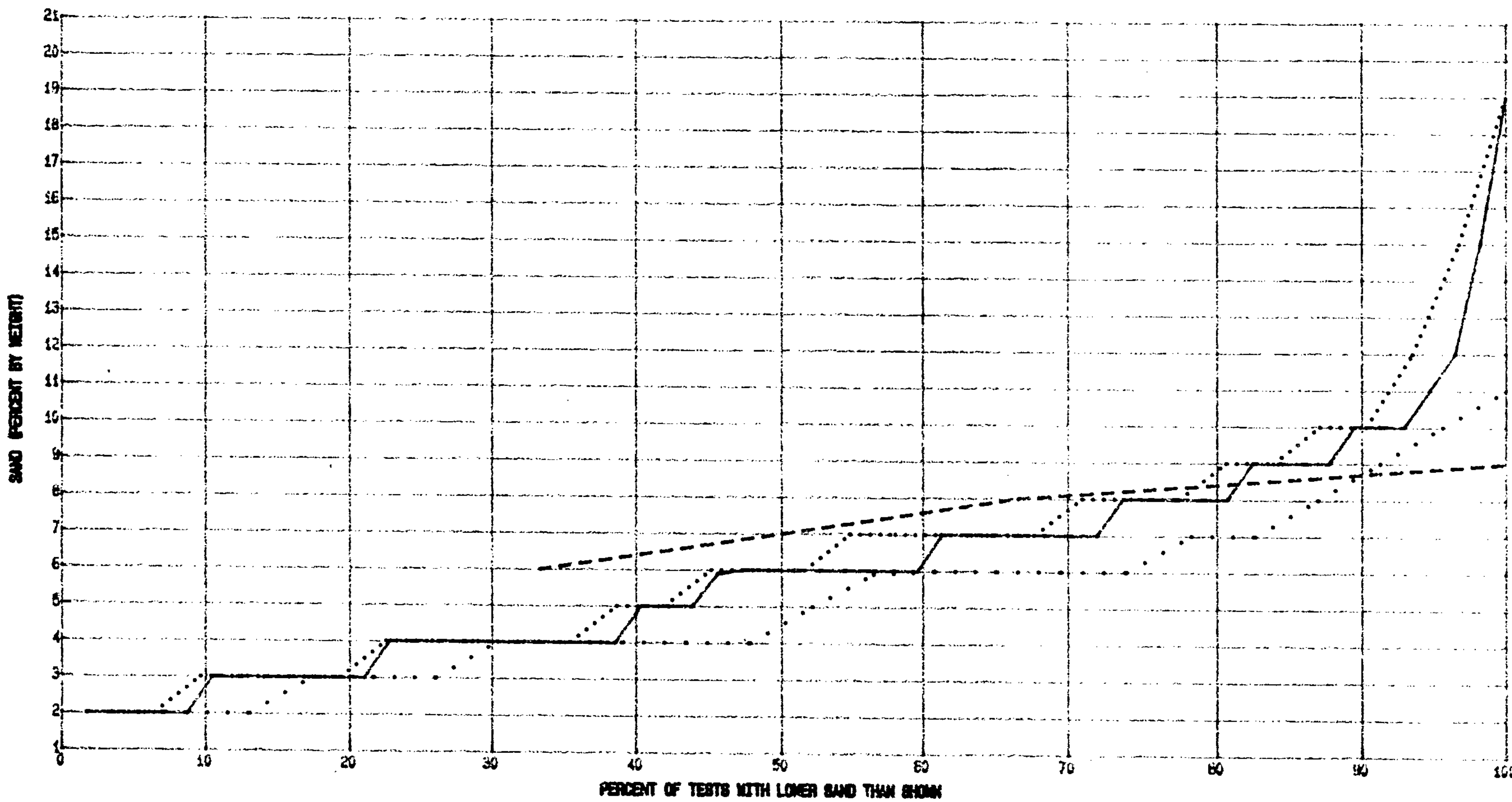
GRAVEL – S-CURVE

Project LITTLE DELL DAM

Area DRAIN FILL II

Boring No.

Date



Line Style	From Date	To Date	# Points	Mean	Std Dev	10 %	Median	90 %
....	01-01-92	12-31-92	31	6.677419	3.780639	3	6	10
. . . . . .	01-01-91	12-31-91	23	5.3	2.528283	2	4	8
— — — —	01-01-90	12-31-90	3	7.666667	1.527525	0	6	8
————	01-01-90	12-31-92	57	6.173684	3.280383	2	6	10

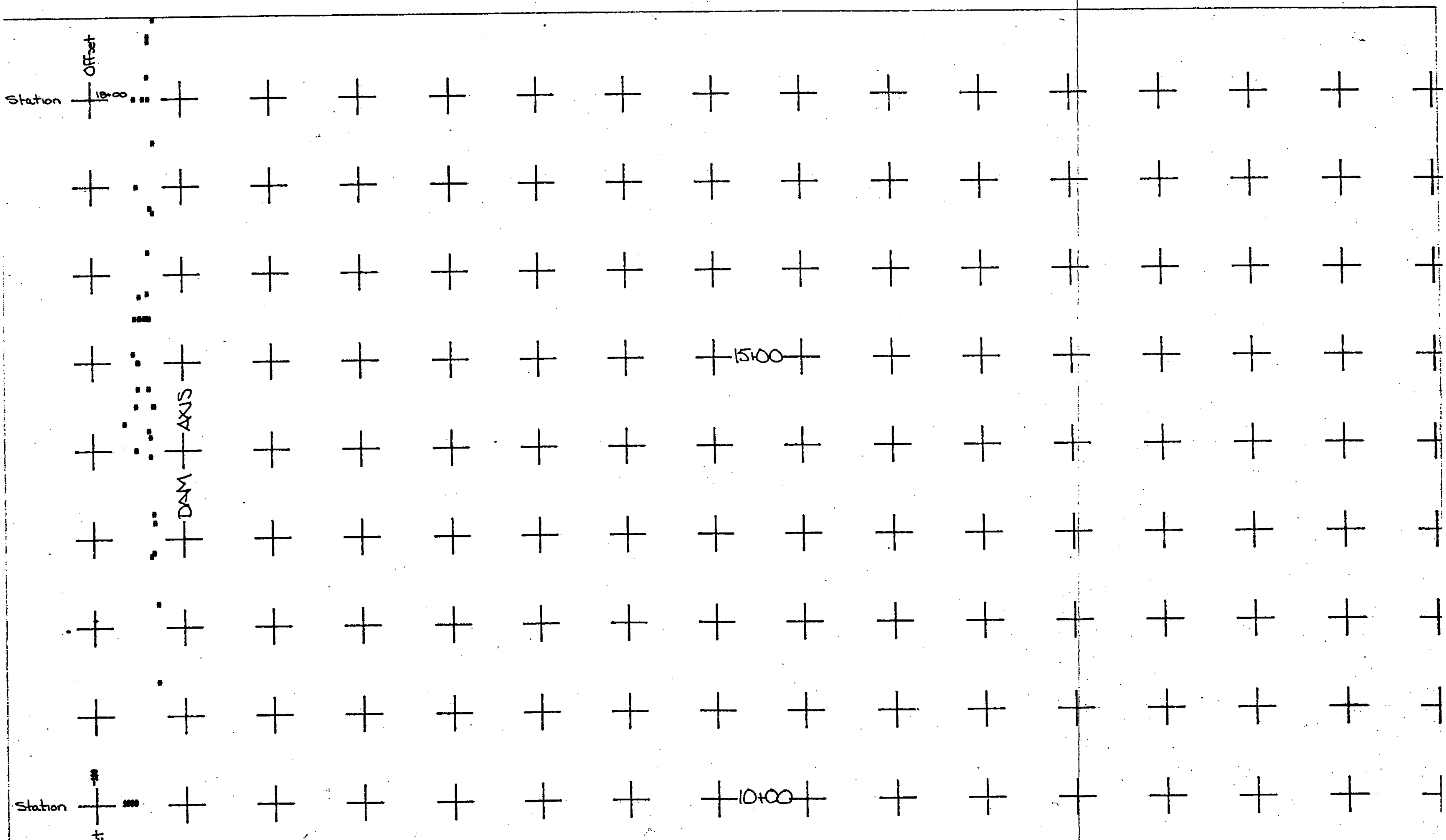
SAND – S-CURVE

Project LITTLE DELL DAM

Area DRAIN FILL II

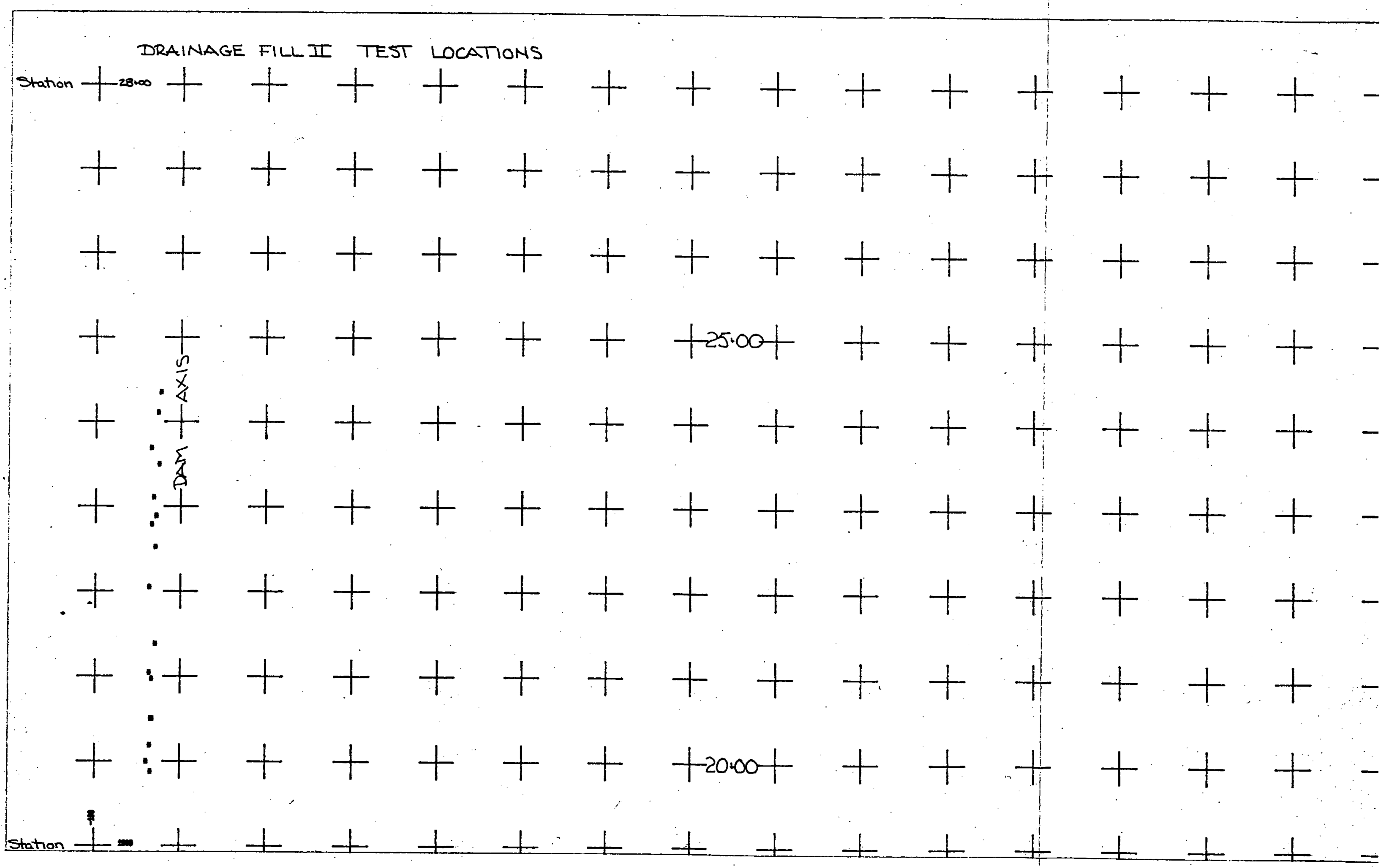
Boring No.

Date



DRAINAGE FILL II TEST LOCATIONS

DRAINAGE FILL II TEST LOCATIONS



APPENDIX III

LOG OF PROJECT MODIFICATIONS

Report date: 09/17/93

CONTRACT NO:	DACW05-89-C-0045	ORIGINAL AMOUNT:	$31,279,990
DESCRIPTION:	LITTLE DELL DAM	NTP DATE:	05/15/89
		SP-1b(1) DAYS:	382
		SP-1b(2) DAYS:	868
LOCATION:	SALT LAKE CITY STREAMS, UTAH	SP-1b(1) ORIG LCD:	6/ 1/90
		SP-1b(2) ORIG LCD:	9/30/91
CONTRACTOR:	CLEMENT STARNES	BONDING COMPANY:	AETNA CASUALTY & SURETY CO
ADDRESS:	P. O. BOX 1628	BOND NUMBER:	
	HICKORY, NC 28603-1628	ADDRESS:	151 FARMINGTON AVENUE
PHONE:	(801) 582-1024		HARTFORD, CT 06156

MOD NUMBER	SPK 84 NUMBER	DESCRIPTION	DATE NEG.	DATE SENT TO D/O	ADD ITEM	MODIFICATION AMOUNT	TIME EXT.	LCD SP-1b(1)	LCD SP-1b(2)
DENIED	VP306	CLAIM - D/S PORTAL SHOTCRETE OVERRUN	05/26/92	05/26/92	0	$ 0	0	6/ 1/90	9/30/91
DENIED	VP307	CLAIM - U/S PORTAL SHOTCRETE OVERRUN	05/26/92	05/26/92	0	$ 0	0	6/ 1/90	9/30/91
DENIED	VP330	CLAIM - GOLF COURSE ROAD PAVING	11/16/92	11/16/92	0	$ 0	0	6/ 1/90	9/30/91
EST.	VP011R	OVERRUN BID ITEMS 011R22	11/19/92	11/19/92	0	$ 756,366	0	6/ 1/90	9/30/91
EST.	VP063	UNDERRUN BID ITEMS 063R2	07/08/92	07/20/92	0	$ -691,904	0	6/ 1/90	9/30/91
P00001	VP990	PROMPT PAYMENT ACT	05/26/89	06/13/89	0	$ 0	0	6/ 1/90	9/30/91
P00002	VP991	CHANGE RESIDENT OFFICE ADDRESS	07/06/89	07/06/89	0	$ 0	0	6/ 1/90	9/30/91
P00003	VP002	TIME EXTENSION, DELAY IN AWARD	07/23/89	08/07/89	0	$ 0	18	6/19/90	10/18/91
P00004	VP001	MOVE TEMPORARY OFFICE	08/07/89	08/23/89	206	$ 0	0	6/19/90	10/18/91
P00005	VP005	DECREASE MODULAR BUILDING SIZE	09/06/89	09/08/89	207	$ -9,338	0	6/19/90	10/18/91
P00006	VP006I	PART I RCP PIPE FOR WASTEFILL #4 DRAIN	01/10/90	01/10/90	208	$ 0	0	6/19/90	10/18/91
P00007	VP003	CHAIN LINK FENCE	01/12/90	01/26/90	209	$ 24,500	0	6/19/90	10/18/91
P00008	VP009	BULKHEAD GATE GUIDE PLATES	01/12/90	01/17/90	209	$ 3,693	0	6/19/90	10/18/91
P00009	VP993	WEATHER TIME EXTENSION - NOVEMBER 1989	02/07/90	06/27/90	0	$ 0	3	6/19/90	10/21/91
P00010	VP010	ADD REFERENCE MONUMENTS	02/16/90	02/17/90	210	$ 4,075	0	6/19/90	10/21/91
P00011	VP023	METAL SEATED BALL VALVES	03/05/90	03/15/90	212	$ 28,536	0	6/19/90	10/21/91
P00012	VP020	D/S PORTAL REFERENCE MONUMENTS	03/07/90	03/23/90	211	$ 2,125	0	6/19/90	10/21/91
P00013	VP028	BITUMINOUS WRAP FOR TRANSDUCER LINES	05/11/90	06/01/90	213	$ 963	0	6/19/90	10/21/91
P00014	VP012	PLASTIC LINED ELECTRICAL CONDUIT	05/23/90	06/01/90	214	$ 8,000	0	6/19/90	10/21/91
P00015	VP024	LAB SOILS DRYING SLABS	06/04/90	06/15/90	215	$ 24,636	0	6/19/90	10/21/91
P00016	VP025	TIEBACKS FOR STEEL SETS IN TUNNEL	05/11/90	06/01/90	216	$ 1,216	0	6/19/90	10/21/91
P00017	VP026	CATHODIC PROTECTION WATER QUAL INTAKE	06/04/90	06/12/90	217	$ 9,113	0	6/19/90	10/21/91
P00018	VP031	ADDITIONAL LAB SUPPLIES	07/24/90	07/30/90	218	$ 15,385	0	6/19/90	10/21/91
P00019	VP032	HORIZONTAL DRAINS	07/24/90	07/30/90	219	$ 3,052	0	6/19/90	10/21/91
P00020	VP022	DELETE TEMPORARY EROSION CONTROL SEEDING	07/25/90	08/02/90	220	$ -8,255	0	6/19/90	10/21/91
P00021	VP033	LAB DRYING OVEN	07/26/90	08/02/90	221	$ 14,454	0	6/19/90	10/21/91
P00022	VP006II	PART II RCP PIPE FOR WASTE FILL #4	07/24/90	01/17/91	208	$ 95,000	0	6/19/90	10/21/91
P00023	VP994	CONTRACTOR ADDRESS CHANGE	08/15/90	08/07/90	0	$ 0	0	6/19/90	10/21/91
P00024	VP995	WEATHER TIME EXTENSION - JULY 1990	08/27/90	10/10/90	0	$ 0	2	6/19/90	10/23/91
P00025	VP037	HYDROSTATIC TEST STRAIN GAGES	09/12/90	10/16/90	222	$ -1,211	0	6/19/90	10/23/91
P00026	VP029	UTILITY CROSSING-DIVERSION PIPELINE	09/20/90	11/16/90	223	$ 17,950	0	6/19/90	10/23/91
P00027	VP035	UPGRADE ELECTRICAL BREAKERS AND WIRES	09/21/90	12/31/90	224	$ 10,052	0	6/19/90	10/23/91
P00028	VP996	WEATHER TIME EXTENSION - AUGUST 1990	11/09/90	01/17/91	0	$ 0	3	6/19/90	10/26/91
P00029	VP040	COFFERDAM INSTRUMENTATION	01/25/91	01/28/91	225	$ 45,000	0	6/19/90	10/26/91
P00030	VP039	BALL VALVE HEATER THERMOSTATS	01/28/91	02/04/91	226	$ 1,465	0	6/19/90	10/26/91
P00031	VP034	PLUNGE POOL WINGWALL SHORING	02/11/91	03/05/91	227	$ 40,000	0	6/19/90	10/26/91
P00032	VP042	ADDITIONAL LAB SUPPLIES	03/08/91	03/18/91	228	$ 15,250	0	6/19/90	10/26/91
P00033	VP046	DOCS FOUNDATION CONCRETE	04/05/91	04/12/91	229	$ 4,000	0	6/19/90	10/26/91
P00034	VP044	PC PIPELINE PAINT COLOR	04/17/91	04/25/91	0	$ 0	0	6/19/90	10/26/91
P00035	VP041	BULKHEAD GATE TIE ROD STAINLESS STEEL	04/18/91	04/25/91	230	$ 1,050	0	6/19/90	10/26/91
P00036	VP048	PIEZOMETER LOW AIR ENTRY FILTERS	05/14/91	06/05/91	231	$ 7,400	0	6/19/90	10/26/91
P00037	VP036I	PART I - PC DIVERSION STRUCTURAL CHANGES	05/17/91	05/24/91	0	$ 5,000	0	6/19/90	10/26/91
P00038	VP054	REMOVE DETERIORATED IMPERVIOUS CORE	06/19/91	06/26/91	233	$ 3,630	0	6/19/90	10/26/91
P00039	VP036IA	PART Ia - PC DIVERSION STRUCTURE CHANGES	07/10/91	07/11/91	232	$ 30,000	0	6/19/90	10/26/91
P00040	VP057I	ADDITIONAL DENTAL TREATMENT	07/22/91	08/14/91	234	$ 100,000	0	6/19/90	10/26/91
P00041	VP058	EXIT SILL FOOTING	08/01/91	08/23/91	235	$ 7,500	0	6/19/90	10/26/91

MOD NUMBER	SPK 84 NUMBER	DESCRIPTION	DATE NEG.	DATE SENT TO D/O	ADD ITEM	MODIFICATION AMOUNT	TIME EXT.	LCD SP-1b(1)	LCD SP-1b(2)
P00042	VP051I	REDUCE CHIMNEY DRAIN WIDTH	08/08/91	08/16/91	236	$ -74,520	0	6/19/90	10/26/91
P00043	VP998	CONTRACTOR ADDRESS CHANGE - PAYMENTS	08/16/91	08/16/91	0	$ 0	0	6/19/90	10/26/91
P00044	VP045	MISCELLANEOUS ELECTRICAL CHANGES	08/09/91	08/22/91	237	$ 3,875	0	6/19/90	10/26/91
P00045	VP059	ACCESS ROAD "A" ALIGNMENT AND GATES	08/09/91	08/20/91	238	$ 3,450	0	6/19/90	10/26/91
P00046	VP043	DOCS BUILT UP ROOF SLOPE	08/23/91	08/30/91	239	$ 5,800	0	6/19/90	10/26/91
P00047	VP062	ADDITIONAL LAB SUPPLIES	08/23/91	10/24/91	240	$ 15,501	0	6/19/90	10/26/9'
P00048	VP997	WEATHER TIME EXTENSION - NOVEMBER 1990	10/10/91	10/29/91	0	$ 0	221	6/19/90	6/ 3/92
P00049	VP030R1	LAKE AREA CLEARING	09/27/91	10/23/91	241	$ 210,000	0	6/19/90	6/ 3/92
P00050	VP061	NO AIR DRILLING INSTRUMENTATION	10/21/91	11/04/91	242	$ 22,600	0	6/19/90	6/ 3/92
P00051	VP064	TUNNEL GROUT PIPE CAPS	11/22/91	12/11/91	243	$ 19,575	0	6/19/90	6/ 3/92
P00052	VP027	DIVERSION PIPE-GOLF COURSE INTERFERENCE	04/29/92	05/07/92	244	$ 18,000	0	6/19/90	6/ 3/92
P00053	VP065	ADDITIONAL STONE PROTECTION TESTING	12/03/91	01/15/92	245	$ -3,200	0	6/19/90	6/ 3/92
P00054	VP038	WASTE FILL #4 RIP RAP	01/08/92	02/13/92	246	$ 48,600	0	6/19/90	6/ 3/92
P00055	VP066	VEP 92-4C, DELETE DOCS CONCRETE STAIN	02/04/92	02/27/92	247	$ -7,975	0	6/19/90	6/ 3/92
P00056	VP067	PAINT VALVES IN ECC/DOCS	03/05/92	03/10/92	0	$ 0	0	6/19/90	6/ 3/92
P00057	VP333	CLAIM - SKYLINE BUY AMERICAN SUSPENSION	03/17/92	03/30/92	248	$ 0	0	6/19/90	6/ 3/92
P00057	VP068	PRESSURE TRANSDUCER LINE ROUTING CHANGE	03/17/92	03/30/92	248	$ 620	0	6/19/90	6/ 3/92
P00058	VP072	ECC BALL VALVE CONTROL WIRING	05/14/92	06/04/92	249	$ 2,400	0	6/19/90	6/ 3/92
P00059	VP070	ADDITIONAL INSTRUMENTATION TRENCH	05/28/92	04/15/92	251	$ 3,500	0	6/19/90	6/ 3/92
P00060	VP999	ADDITIONAL (Continuing) FUNDING	06/09/92	06/09/92	0	$ 0	0	6/19/90	6/ 3/92
P00061	VP900I	WEATHER TIME EXTENSION-MAY 1992	06/09/92	07/07/92	0	$ 0	6	6/19/90	6/ 9/92
P00062	VP073	SPILLWAY TURNAROUND ENBANKMENT	07/09/92	07/15/92	250	$ 39,060	0	6/19/90	6/ 9/92
P00063	VP901	ADDITIONAL (Continuing) FUNDS	07/23/92	07/23/92	0	$ 0	0	6/19/90	6/ 9/92
P00064	VP075	ADD OBSERVATION WELL OW-3	07/30/92	08/06/92	252	$ 23,000	0	6/19/90	6/ 9/92
P00065	VP900II	WEATHER TIME EXTENSION - MAY 1992 (C.O.)	07/23/92	07/23/92	0	$ 0	0	6/19/90	6/ 9/92
P00066	VP074	INSTRUMENTATION FOOTPATH	08/28/92	08/31/92	253	$ 33,600	0	6/19/90	6/ 9/92
P00067	VP077	TOP OF DAM ROAD DITCH LINING	08/28/92	08/31/92	254	$ 5,531	0	6/19/90	6/ 9/92
P00068	VP902	ADDITONAL (Conrinuing) FUNDS	08/27/92	09/02/92	0	$ 0	0	6/19/90	6/ 9/92
P00069	VP081	REZONE U/S EMBANKMENT RANDOM IV	09/02/92	09/04/92	0	$ 0	0	6/19/90	6/ 9/92
P00070	VP078	MISCELLANEOUS MECHANICAL CHANGES	09/25/92	10/25/92	255	$ 3,040	0	6/19/90	6/ 9/92
P00071	VP080	U/S INSTRUMENTATION FOOTPATH	09/25/92	10/25/92	256	$ 7,700	0	6/19/90	6/ 9/92
P00072	VP903	ADDITIONAL (Continuing) FUNDS	10/15/92	10/15/92	0	$ 0	0	6/19/90	6/ 9/92
P00073	VP082I	DELETE ALTERNATE BORROW RESTORATION	11/16/92	11/02/92	257	$ -250,000	0	6/19/90	6/ 9/92
P00074	VP084	BULKHEAD GATE CAGE	11/04/92	11/23/92	258	$ 9,560	0	6/19/90	6/ 9/92
P00075	VP085	ACCELEROGRAPH PADS	10/27/92	11/23/92	259	$ 8,095	0	6/19/90	6/ 9/92
P00076	VP904	ADDITIONAL (Continuing) FUNDS	01/15/93	01/15/93	0	$ 0	0	6/19/90	6/ 9/92
P00077	VP079	MISCELLANEOUS PAINTING CHANGES	12/16/92	02/24/93	260	$ 32,956	0	6/19/90	6/ 9/92
P00078	VP083	GEOLOGIC EXPLORATION	12/16/92	03/22/93	261	$ 21,925	0	6/19/90	6/ 9/92
P00079	VP090	OVERBURDEN U/S TOE DITCH	12/16/92	13/22/93	262	$ 2,970	0	6/19/90	6/ 9/92
P00080	VP095	MEADOW TRAIL	12/16/92	03/22/93	263	$ 2,500	0	6/19/90	6/ 9/92
P00081	VP093	DELETE PAINTING GALVANIZED SURFACES	12/16/92	03/22/93	264	$ -3,460	0	6/19/90	6/ 9/92
P00082	VP096	RECOATING 42" TUNNEL PIPE	03/24/93	04/12/93	265	$ 58,800	0	6/19/90	6/ 9/92
P00083	VP089	TOE DRAIN CATCH BASIN GRATE	03/30/93	04/20/93	266	$ ·2,140	0	6/19/90	6/ 9/92
P00084	VP091	GROUT FLUMES & WEIRS, ADD WEIR "C"	04/15/93	04/30/93	267	$ 17,940	0	6/19/90	6/ 9/92
P00085	VP092	INCLINOMETER CALIBRATION HOLE	04/15/93	04/30/93	268	$ 6,490	0	6/19/90	6/ 9/92
P00086	VP094	BULKHEAD GATE PANEL CHANGES	04/15/93	04/30/93	269	$ 3,345	0	6/19/90	6/ 9/92
P00087	VP100	BULKHEAD HYDRAULIC SYSTEM COVER	06/16/93	06/25/93	270	$ 11,170	0	6/19/90	6/ 9/92
P00088	VP101	EXTEND PLUNGE POOL RIPRAP GROUT	06/16/93	06/25/93	271	$ 11,895	0	6/19/90	6/ 9/92
P00089	VP097	PONY EXPRESS BORROW IMPACT	06/16/93	06/25/93	272	$ -1,495	0	6/19/90	6/ 9/92
P00090	VP102	SITE DRAINAGE	08/06/93	08/16/93	273	$ 11,780	0	6/19/90	6/ 9/92
P00091	VP106	PC EXIT CHANNEL IMPROVEMENTS	07/15/93	08/06/93	274	$ 4,675	0	6/19/90	6/ 9/92
P00092	VP098	DIVERSION STRUCTURE FENCING	07/29/93	08/06/93	275	$ 34,135	0	6/19/90	6/ 9/92
P00093	VP103	SPRING DRAIN EXTENSION	07/09/93	08/06/93	276	$ 5,290	0	6/19/90	6/ 9/92
P00094	VP107	DOCS DRAINAGE	07/28/93	08/06/93	277	$ 9,980	0	6/19/90	6/ 9/92
P00095	VP104	INSTALL ACCELEROGRAPH ENCLOSURES & WEIR	08/09/93	08/16/93	278	$ 4,135	0	6/19/90	6/ 9/92
P00096	VP108	MISC. OPERATIONAL/SAFETY CHANGES	09/14/93		279	$ 10,790	0	6/19/90	6/ 9/92

CURRENT CONTRACT AMOUNT: $ 32,244,466

Report date: 09/17/93

CONTRACT NO:	DACW05-91-C-0084	ORIGINAL AMOUNT:	$$$$594,878
DESCRIPTION:	RIPARIAN MITIGATION PLANTING	NTP DATE:	05/23/91
	LITTLE DELL LAKE	SP-1b(1) DAYS:	192
		SP-1b(2) DAYS:	1288
LOCATION:	SALT LAKE CITY STREAMS, UTAH	SP-1b(1) ORIG LCD:	12/ 1/91
		SP-1b(2) ORIG LCD:	12/ 1/94
CONTRACTOR:	RECLAMATION ENGINEERING & CONSTRUCTION	BONDING COMPANY:	
ADDRESS:	P. O. BOX 1600	BOND NUMBER:	
	PARK CITY, UTAH 84060	ADDRESS:	
PHONE:	(801) 645-7313		

MOD NUMBER	SPK 84 NUMBER	DESCRIPTION	DATE NEG.	DATE SENT TO D/O	ADD ITEM	MODIFICATION AMOUNT	TIME EXT.	LCD SP-1b(1)	LCD SP-1b(2)
P00001	VP001	POSTPONE VISTA MEADOWS PLANTING	10/18/91	10/30/91	3	$ 3,280	0	12/ 1/91	12/ 1/94
P00002	VP002	PLANT SUBSTITUTIONS	12/04/91	12/16/91	3	$ -1,075	0	12/ 1/91	12/ 1/94
P00003	VP004	WEATHER TIME EXTENSION - 1991 SEASON	05/07/92	06/05/92	0	$ 0	183	6/ 1/92	6/ 2/95
P00004	VP003	LIVESTOCK FENCING JORDAN RIVER SITE 2A	07/21/92	07/27/92	4	$ 28,640	122	10/ 1/92	6/ 2/95
P00005	VP007	GEOLOGIC EXPLORATION IMPACT	09/29/92	10/21/92	5	$ 2,550	0	10/ 1/92	6/ 2/95
P00006	VP006	DELETE PARLEY'S CREEK PLANTING	03/15/93	04/26/93	6	$ -37,100	0	10/ 1/92	6/ 2/95
P00007	VP008	PONY EXPRESS BORROW	03/15/93	03/24/93	7	$ 1,494	0	10/ 1/92	6/ 2/95

CURRENT CONTRACT AMOUNT: $ 592,667

Little Dell Resident Office Mod Log
AS OF 09/17/93

COMPLETE LISTING

CONTRCT	84 NO	DESCRIPTION	INCEP DATE	RFP SENT	C.P. RCVD	C.P. AMOUNT	NEG DATE	NEG AMOUNT	NEG DAYS	MOD NO.	MOD SENT TO KTR.	FINAL TO D/O	FE NO
A890045	VP001	MOVE TEMPORARY OFFICE	05/24/89	05/24/89	07/14/89	42	08/07/89	0	0	P00004	08/18/89	08/23/89	
"	VP002	TIME EXTENSION, DELAY IN AWARD	05/31/89				07/23/89	0	18	P00003	07/23/89	08/07/89	
"	VP003	CHAIN LINK FENCE	06/28/89	11/02/89	12/15/89	25,808	01/12/90	24,500	0	P00007	01/17/90	01/26/90	
"	VP004	SEQUENCE OF CONSTRUCTION-DIVERSION PIPE	07/06/89	07/12/89	08/02/89	37,260	08/22/89	0	0	CANCEL	08/22/89	08/22/89	
"	VP005	DECREASE MODULAR BUILDING SIZE	07/12/89	07/20/89	08/02/89	-9,084	09/06/89	-9,338	0	P00005	09/07/89	09/08/89	
"	VP006I	PART I RCP PIPE FOR WASTEFILL #4 DRAIN	08/09/89	09/01/89	11/07/89	103,483	01/10/90	0	0	P00006	01/10/90	01/10/90	
"	VP006II	PART II RCP PIPE FOR WASTE FILL #4	08/09/89	09/01/89	11/07/89	103,483	07/24/90	95,000	0	P00022	11/09/90	01/17/91	
"	VP007	DECREASE SAFETY RAIL BID ITEM 137	08/18/89	08/22/89	08/31/89	0	10/13/89	0	0	CANCEL	10/13/89	08/31/89	
"	VP008	QUANTITY OF 42' RCP PIPE	08/24/89	08/25/89	08/31/89	0	08/31/89	0	0	CANCEL	09/07/89	08/31/89	
"	VP009	BULKHEAD GATE GUIDE PLATES	09/22/89	10/03/89	11/20/89	7,451	01/12/90	3,693	0	P00008	01/16/90	01/17/90	
"	VP010	ADD REFERENCE MONUMENTS	10/31/89	11/03/89	02/07/90	4,075	02/16/90	4,075	0	P00010	02/16/90	02/17/90	
"	VP011R	OVERRUN BID ITEMS 011R22	12/17/91	12/11/89			11/19/92	756,366	0	EST.	11/19/92	11/19/92	
		REMARKS: SUMMARY SPK 84 - OBLIGATING FUNDS FOR OVERRUNS OF BID ITEMS											
"	VP012	PLASTIC LINED ELECTRICAL CONDUIT	12/04/89	12/07/89	01/03/90	9,590	05/23/90	8,000	0	P00014	05/24/90	06/01/90	
"	VP013	CANCELLED	12/05/89		11/21/89	0	02/14/90	0	0	CANCEL	02/14/90	02/14/90	
"	VP014	CANCELLED	12/05/89		11/21/89	0	02/14/90	0	0	CANCEL	02/14/90	02/14/90	
"	VP015	CANCELLED	12/05/89		11/28/89	0	02/14/90	0	0	CANCEL	02/14/90	02/14/90	
"	VP016	CANCELLED	12/13/89		09/30/89	0	02/14/90	0	0	CANCEL	02/14/90	02/14/90	
"	VP017	CANCELLED	12/13/89		09/30/89	0	02/14/90	0	0	CANCEL	02/14/90	02/14/90	
"	VP018	CANCELLED	12/13/89		11/28/89	0	02/14/90	0	0	CANCEL	02/14/90	02/14/90	
"	VP019	CANCELLED	12/21/89		12/15/89	0	01/08/90	0	0	CANCEL	01/08/90	01/08/90	
"	VP020	D/S PORTAL REFERENCE MONUMENTS	01/02/90	01/03/90	01/08/90	2,472	03/07/90	2,125	0	P00012	03/07/90	03/23/90	
"	VP021	QA PERSONEL CREDIT - CLAIM VP313	01/10/90	01/12/90			05/03/90	0	0	CANCEL	05/04/90	05/18/90	
"	VP022	DELETE TEMPORARY EROSION CONTROL SEEDING	01/10/90	01/12/90	07/09/90	-8,255	07/25/90	-8,255	0	P00020	07/25/90	08/02/90	
"	VP023	METAL SEATED BALL VALVES	01/26/90	01/26/90	02/05/90	28,536	03/05/90	28,536	0	P00011	03/07/90	03/15/90	
"	VP024	LAB SOILS DRYING SLABS	03/09/90	03/26/90	04/18/90	26,154	06/04/90	24,636	0	P00015	06/05/90	06/15/90	
"	VP025	TIEBACKS FOR STEEL SETS IN TUNNEL	03/22/90	03/22/90	03/27/90	6,970	05/11/90	1,216	0	P00016	05/11/90	06/01/90	
"	VP026	CATHODIC PROTECTION WATER QUAL INTAKE	03/22/90	03/27/90	04/09/90	7,399	06/04/90	9,113	0	P00017	06/04/90	06/12/90	
"	VP027	DIVERSION PIPE-GOLF COURSE INTERFERENCE	05/02/90	05/03/90	10/25/91	28,527	04/29/92	18,000	0	P00052	05/07/92	05/07/92	
"	VP028	BITUMINOUS WRAP FOR TRANSDUCER LINES	04/03/90	04/03/90	04/03/90	964	05/11/90	963	0	P00013	05/14/90	06/01/90	
"	VP029	UTILITY CROSSING-DIVERSION PIPELINE	04/30/90	07/02/90	08/06/90	17,057	09/20/90	17,950	0	P00026	11/13/90	11/16/90	
"	VP030R1	LAKE AREA CLEARING	09/17/91	09/17/91	09/19/91	285,702	09/27/91	210,000	0	P00049	11/19/91	10/23/91	
"	VP031	ADDITIONAL LAB SUPPLIES	06/06/90	06/13/90	06/26/90	15,396	07/24/90	15,385	0	P00018	07/24/90	07/30/90	
"	VP032	HORIZONTAL DRAINS	06/25/90		07/03/90	3,052	07/24/90	3,052	0	P00019	07/25/90	07/30/90	
"	VP033	LAB DRYING OVEN	06/28/90	07/05/90	07/10/90	14,548	07/26/90	14,454	0	P00021	07/26/90	08/02/90	
"	VP034	PLUNGE POOL WINGWALL SHORING	06/29/90	07/16/90	11/15/90	44,173	02/11/91	40,000	0	P00031	03/01/91	03/05/91	
"	VP035	UPGRADE ELECTRICAL BREAKERS AND WIRES	07/04/90	07/04/90	08/06/90	9,597	09/21/90	10,052	0	P00027	12/14/90	12/31/90	
"	VP036I	PART I - PC DIVERSION STRUCTURAL CHANGES	07/27/90	05/10/91			05/17/91	5,000	0	P00037	05/24/91	05/24/91	
"	VP036IA	PART Ia - PC DIVERSION STRUCTURE CHANGES	07/10/91	06/21/91			07/10/91	30,000	0	P00039	07/11/91	07/11/91	
"	VP036IB	PART Ib - PC DIVERSION STRUCTURAL CHANGE	05/17/91	05/10/91	08/17/91	486,300							
		REMARKS: PART II OF II		IM-0134, SL-1052, CS-1113									
"	VP037	HYDROSTATIC TEST STRAIN GAGES	07/26/90	08/20/90	09/07/90	-1,211	09/12/90	-1,211	0	P00025	09/12/90	10/16/90	
"	VP038	WASTE FILL #4 RIP RAP	10/03/90	10/04/90	08/23/91	97,345	01/08/92	48,600	0	P00054	02/04/92	02/13/92	
"	VP039	BALL VALVE HEATER THERMOSTATS	09/21/90	09/21/90	01/14/91	1,465	01/28/91	1,465	0	P00030	01/31/91	02/04/91	
"	VP040	COFFERDAM INSTRUMENTATION	12/04/90	12/04/90	12/29/90	54,588	01/25/91	45,000	0	P00029	01/25/91	01/28/91	
"	VP041	BULKHEAD GATE TIE ROD STAINLESS STEEL	01/03/91	01/07/91	03/29/91	1,050	04/18/91	1,050	0	P00035	04/23/91	04/25/91	
"	VP042	ADDITIONAL LAB SUPPLIES	02/27/91	02/28/91	03/05/91	15,283	03/08/91	15,250	0	P00032	03/12/91	03/18/91	

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Little Dell Resident Office Mod Log
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CONTRCT	84 NO	DESCRIPTION	INCEP DATE	RFP SENT	C.P. RCVD	C.P. AMOUNT	NEG DATE	NEG AMOUNT	NEG DAYS	MOD NO.	MOD SENT TO KTR.	FINAL TO D/O	FECP NO.
A890045	VP043	DOCS BUILT UP ROOF SLOPE	03/01/91	06/25/91	08/21/91	12,490	08/23/91	5,800	0	P00046	08/23/91	08/30/91	
"	VP044	PC PIPELINE PAINT COLOR	03/01/91	03/01/91	03/15/91	0	04/17/91	0	0	P00034	04/22/91	04/25/91	
"	VP045	MISCELLANEOUS ELECTRICAL CHANGES	03/15/91	04/23/91	05/15/91	4,400	08/09/91	3,875	0	P00044	08/20/91	08/22/91	
"	VP046	DOCS FOUNDATION CONCRETE	04/05/91	04/05/91	04/05/91	4,000	04/05/91	4,000	0	P00033	04/09/91	04/12/91	
"	VP047	DELETE GROUT MUD BALANCE TESTING	04/29/91	04/29/91	05/02/91	0				CANCEL	08/19/91	08/19/91	
"	VP048	PIEZOMETER LOW AIR ENTRY FILTERS	04/29/91	05/01/91	05/06/91	7,400	05/14/91	7,400	0	P00036	05/16/91	06/05/91	
"	VP051I	REDUCE CHIMNEY DRAIN WIDTH	06/14/91	06/13/91	06/24/91	-74,520	08/08/91	-74,520	0	P00042	08/16/91	08/16/91	
"	VP051II	VEP REDUCE CHIMNEY DRAIN WIDTH	06/14/91	06/18/91									
		REMARKS: PART II OF II				CS-1173							
"	VP052	PC RIPRAP	05/17/91	05/21/91			07/30/91	0	0	CANCEL	07/30/91	07/30/91	
"	VP053	VECP-LOWER PIPELINE ELEVATION	06/10/91	06/07/91	06/07/91	-37,242							
		REMARKS: VECP APPROVED				IM-0194							
"	VP054	REMOVE DETERIORATED IMPERVIOUS CORE	06/14/91	06/14/91	06/19/91	3,257	06/19/91	3,630	0	P00038	06/24/91	06/26/91	
"	VP055	VECP - ELIMINATE TRANSITION FILL II SAND	06/17/91	06/17/91	06/17/91	-25,000	07/24/91		0	CANCEL	07/24/91	07/24/91	
"	VP056	PORTAL QUANTITY OVERRUNS	07/05/91	07/05/91	08/19/91	233,815							
		REMARKS: UNILATERAL MOD IN PROCESS BY RE				CS-1256							
"	VP057I	ADDITIONAL DENTAL TREATMENT	07/10/91				07/22/91	100,000	0	P00040	07/22/91	08/14/91	
"	VP057II	ADDITIONAL DENTAL TREATMENT	07/10/91	07/22/91									
		REMARKS: PART II OF II ADDITIONAL FOUNDATION PREP				MR-0040							
"	VP058	EXIT SILL FOOTING	07/03/91	07/03/91	07/12/91	8,245	08/01/91	7,500	0	P00041	08/01/91	08/23/91	
"	VP059	ACCESS ROAD "A" ALIGNMENT AND GATES	07/09/91	07/11/91	07/18/91	8,610	08/09/91	3,450	0	P00045	08/20/91	08/20/91	
"	VP061	NO AIR DRILLING INSTRUMENTATION	08/07/91	08/08/91	08/21/91	30,806	10/21/91	22,600	0	P00050	10/30/91	11/04/91	
"	VP062	ADDITIONAL LAB SUPPLIES	08/15/91	08/16/91	08/22/91	17,199	08/23/91	15,501	0	P00047	10/23/91	10/24/91	
"	VP063	UNDERRUN BID ITEMS 063R2	12/17/91	09/16/91			07/08/92	-691,904	0	EST.		07/20/92	
		REMARKS: DE-OBLIGATING FUNDS DUE TO UNDERRUNS IN BID ITEM QUANTITIES											
"	VP064	TUNNEL GROUT PIPE CAPS		11/25/91	10/28/91	9,191	11/22/91	19,575	0	P00051	12/09/91	12/11/91	
"	VP065	ADDITIONAL STONE PROTECTION TESTING	12/03/91		12/03/91	-3,200	12/03/91	-3,200	0	P00053	01/10/92	01/15/92	
"	VP066	VEP 92-4C, DELETE DOCS CONCRETE STAIN	01/03/92	01/06/92	02/04/92	-7,975	02/04/92	-7,975	0	P00055	02/24/92	02/27/92	
"	VP067	PAINT VALVES IN ECC/DOCS	02/11/92	02/11/92	03/02/92	0	03/05/92	0	0	P00056	03/05/92	03/10/92	
"	VP068	PRESSURE TRANSDUCER LINE ROUTING CHANGE	03/10/92	03/10/92	03/16/92	2,776	03/17/92	620	0	P00057	03/26/92	03/30/92	
"	VP069	ELECTRICAL CONDUCTOR SIZE	03/24/92	03/24/92	04/07/90	0	04/07/92	0	0	CANCEL	04/07/92	04/07/92	
"	VP070	ADDITIONAL INSTRUMENTATION TRENCH	05/04/92	05/05/92	05/21/92	3,915	05/28/92	3,500	0	P00059	07/14/92	04/15/92	
"	VP071	RANDOM II GRAVEL CONTENT REDUCTION	05/12/92	05/13/92			11/18/92		0	CANCEL	11/18/92	11/18/92	
"	VP072	ECC BALL VALVE CONTROL WIRING	05/07/92	05/07/92	05/07/92	2,418	05/14/92	2,400	0	P00058	05/29/92	06/04/92	
"	VP073	SPILLWAY TURNAROUND EMBANKMENT	06/22/92	06/22/92	06/29/92	58,158	07/09/92	39,060	0	P00062	07/10/92	07/15/92	
"	VP074	INSTRUMENTATION FOOTPATH	07/01/92	07/01/92	07/13/92	33,601	08/28/92	33,600	0	P00066	08/28/92	08/31/92	
"	VP075	ADD OBSERVATION WELL OW-3	07/30/92	07/20/92	07/26/92	30,367	07/30/92	23,000	0	P00064	07/31/92	08/06/92	
"	VP076	VECP - T.O.D. ACCESS ROAD ALIGNMENT	07/24/92	07/24/92	07/24/92	-30,992	08/20/92	0	0	CANCEL	08/20/92	08/20/92	
"	VP077	TOP OF DAM ROAD DITCH LINING	08/24/92	08/24/92	08/28/92	5,531	08/28/92	5,531	0	P00067	08/28/92	08/31/92	
"	VP078	MISCELLANEOUS MECHANICAL CHANGES	08/26/92	08/26/92	08/31/92	3,234	09/25/92	3,040	0	P00070	10/22/92	10/25/92	
"	VP079	MISCELLANEOUS PAINTING CHANGES	08/26/92	08/26/92	11/23/92	24,484	12/16/92	32,956	0	P00077	02/19/93	02/24/93	
"	VP080	U/S INSTRUMENTATION FOOTPATH	08/28/92	08/28/92	09/25/92	7,700	09/25/92	7,700	0	P00071	10/21/92	10/25/92	
"	VP081	REZONE U/S EMBANKMENT RANDOM IV	09/02/92	09/02/92	09/02/92	0	09/02/92	0	0	P00069	09/04/92	09/04/92	
"	VP082I	DELETE ALTERNATE BORROW RESTORATION	09/25/92	09/25/92	10/14/92	-18,063	11/16/92	-250,000	0	P00073	11/17/92	11/02/92	
"	VP082II	DELETE ALTERNATE BORROW RESTORATION	09/25/92	09/25/92	10/14/92	-18,063							
		REMARKS: PART 2 OF 2 MOD PENDING RENEGOTIATION OF UNILATER MOD P00073											
"	VP083	GEOLOGIC EXPLORATION	09/29/92	10/01/92	10/08/92	10,313	12/16/92	21,925	0	P00078	03/19/93	03/22/93	

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CONTRCT	84 NO	DESCRIPTION	INCEP DATE	RFP SENT	C.P. RCVD	C.P. AMOUNT	NEG DATE	NEG AMOUNT	NEG DAYS	MOD NO.	MOD SENT TO KTR.	FINAL TO O/O	FE[illegible] NO
A890045	VP084	BULKHEAD GATE CAGE	10/08/92	10/08/92	10/27/92	9,282	11/04/92	9,560	0	P00074	11/17/92	11/23/92	
"	VP085	ACCELEROGRAPH PADS	10/08/92	10/08/92	10/15/92	6,205	10/27/92	8,095	0	P00075	11/18/92	11/23/92	
"	VP086	DELETE TEMPORARY EROSION CONTROL SEED	10/26/92	11/17/92	12/15/92	0							
		REMARKS: DELETE STRAW MULCH IN 1990 & 1991. C/S PROPOSED $0. CS-1717											
"	VP087	WASTE FILL #4 DITCH LINING	10/20/92	10/21/92	10/28/92	-7,640							
		REMARKS: USE COBBLES/BOULDERS IN DITCH LINING AT WASTE FILL #4											
"	VP088	TOP OF DAM ELECTRICAL/TELEPHONE CABLE	10/21/92	10/22/92	03/02/93	479							
		REMARKS: REROUTE ELECTRICAL/TELEPHONE CABLES TO D/S DAM FACE CS-1735											
"	VP089	TOE DRAIN CATCH BASIN GRATE	10/21/92	10/22/92	01/29/93	2,180	03/30/93	2,140	0	P00083	04/16/93	04/20/93	
"	VP090	OVERBURDEN U/S TOE DITCH	11/11/92	11/17/92			12/16/92	2,970	0	P00079	03/19/93	13/22/93	
"	VP091	GROUT FLUMES & WEIRS, ADD WEIR "C"	11/13/92	11/20/92	01/29/93	17,941	04/15/93	17,940	0	P00084	04/15/93	04/30/93	
"	VP092	INCLINOMETER CALIBRATION HOLE	11/17/92	11/19/92	02/08/93	6,491	04/15/93	6,490	0	P00085	04/29/93	04/30/93	
"	VP093	DELETE PAINTING GALVANIZED SURFACES	11/17/92,	11/19/92			12/16/92	-3,460	0	P00081	03/19/93	03/22/93	
"	VP094	BULKHEAD GATE PANEL CHANGES	03/31/93	02/11/93	02/11/93	3,346	04/15/93	3,345	0	P00086	04/29/93	04/30/93	
"	VP095	MEADOW TRAIL	11/19/92	11/20/92			12/16/92	2,500	0	P00080	03/19/93	03/22/93	
"	VP096	RECOATING 42" TUNNEL PIPE	03/12/93	03/15/93	03/24/93	58,800	03/24/93	58,800	0	P00082	04/06/93	04/12/93	
"	VP097	PONY EXPRESS BORROW IMPACT	03/17/93	03/17/93	06/16/93	-1,494	06/16/93	-1,495	0	P00089	06/25/93	06/25/93	
"	VP098	DIVERSION STRUCTURE FENCING	04/13/93		06/20/93	34,135	07/29/93	34,135	0	P00092	08/05/93	08/06/93	
"	VP099	PRINTER/PLOTTER ACQUISITION	04/13/93				07/01/93	0	0	CANCEL	07/01/93	07/01/93	
"	VP100	BULKHEAD HYDRAULIC SYSTEM COVER	05/20/93	05/20/93	06/14/93	11,170	06/16/93	11,170	0	P00087	06/22/93	06/25/93	
"	VP101	EXTEND PLUNGE POOL RIPRAP GROUT	05/19/93	05/20/93	05/25/93	23,255	06/16/93	11,895	0	P00088	06/22/93	06/25/93	
"	VP102	SITE DRAINAGE	06/30/93	07/01/93	07/13/93	12,121	08/06/93	11,780	0	P00090	08/12/93	08/16/93	
"	VP103	SPRING DRAIN EXTENSION	07/01/93	07/01/93	07/07/93	5,291	07/09/93	5,290	0	P00093	08/05/93	08/06/93	
"	VP104	INSTALL ACCELEROGRAPH ENCLOSURES & WEIR	07/01/93	07/06/93	07/21/93	839	08/09/93	4,135	0	P00095	08/12/93	08/16/93	
"	VP105	PRIME COAT T.O.D.	07/01/93	07/07/93			08/02/93	0	0	CANCEL	08/02/93	08/02/93	
"	VP106	PC EXIT CHANNEL IMPROVEMENTS	07/01/93	07/07/93	07/14/93	6,425	07/15/93	4,675	0	P00091	08/05/93	08/06/93	
"	VP107	DOCS DRAINAGE	07/06/93	07/07/93	07/21/93	9,987	07/28/93	9,980	0	P00094	08/05/93	08/06/93	
"	VP108	MISC. OPERATIONAL/SAFETY CHANGES	07/27/93	07/27/93	09/24/93	10,790	09/14/93	10,790	0	P00096			
"	VP301	CLAIM - ADMINISTRATIVE DELAY	12/05/89										
		REMARKS: CLAIM- FOR TIME & MONEY FOR ADMIN DELAY, 21 NOV 89 CS-0226											
"	VP302	CLAIM - DEFECTIVE SPECS PORTAL	12/20/89		04/30/91	514,630							
		REMARKS: CLAIM DEFECTIVE SPEC D/S PORTAL. CS-0225, CS-0924, CS-1075											
"	VP303	CLAIM - TUNNEL SHOTCRETING	12/05/89		11/28/89	0	03/05/90	0	0	CANCEL	03/07/90	03/08/90	
		REMARKS: CS-0242 INITIATED POTENTIAL CLAIM, CS-0412 WITHDREW CLAIM											
"	VP304	CLAIM - OUTLET WORKS FOUNDATION FILL	12/13/89										
		REMARKS: POT. CLAIM-OUTLET WORKS FOUNDATION ENGINEERED FILL, CS-0129											
"	VP305	CLAIM - COMPACTION & SHOTCRETE REBOUND	12/05/89										
		REMARKS: CLAIM - OFFICE COMPACTION/SHOTCRETE REBOUND, CS-0130											
"	VP306	CLAIM - D/S PORTAL SHOTCRETE OVERRUN	12/13/89				05/26/92	0	0	DENIED	05/26/92	05/26/92	
"	VP307	CLAIM - U/S PORTAL SHOTCRETE OVERRUN	02/26/90				05/26/92	0	0	DENIED	05/26/92	05/26/92	
"	VP308	CLAIM - UNSTABLE SOIL IN TUNNEL	03/08/90										
		REMARKS: POTENTIAL CLAIM - UNSTABLE TUNNEL SOILS, CS-0416, CS-0417											
"	VP309	CLAIM - U/S PORTAL OUT OF LIMITS WORK	03/27/90				08/16/91	0	0	CANCEL	08/16/91	08/16/91	
"	VP310	CLAIM - TUNNEL SAFETY DIRECTIVES	03/28/90										
		REMARKS: POT. CLAIM-TUNNEL SAFETY DIRECTIVES FROM RE, CS-0449											
"	VP311	CLAIM - TUNNEL DEWATERING	03/30/90										
		REMARKS: POTENTIAL CLAIM - TUNNEL DEWATERING OPERATIONS, CS-0435											

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Little Dell Resident Office Mod Log
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COMPLETE LISTING

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A890045	VP312	CLAIM - EMBANKMENT DELAYS	05/10/90										
		REMARKS: CLAIM - DELAY BY CORPS STAFF, 10-14 MAY 89, CS-0524, CS-0533											
"	VP313	CLAIM - QA LAB PERSONNEL	06/05/90										
		REMARKS: CLAIM AGAINST CONTRACTOR FOR QA LAB PERSONNEL NOT PROVIDED											
"	VP314	CLAIM - ECC SHUTDOWN	07/05/90										
		REMARKS: CLAIM FOR DELAY FROM RE SAFETY DIRECTIVE SL-0531, CS-0627											
"	VP315	CLAIM - ECC SUPPORT ROCK BOLT/ANCHORS	07/05/90										
		REMARKS: CLAIM - FULLY ENCAPSULATED ROCK BOLTS, CS-0626											
"	VP316	CLAIM - ECC SAFETY SPOTTERS	07/05/90										
		REMARKS: CLAIM - SAFETY ENGINEER IN TUNNEL, CS-0628											
"	VP317	CLAIM - TUNNEL GROUT NIPPLES	08/28/90										
		REMARKS: CLAIM - TUNNEL GROUT NIPPLE LENGTH IN ECC, 8/24/90, CS-00715											
"	VP318	CLAIM - FOUNDATION EXCAVATION	08/30/90										
		REMARKS: POT. CLAIM-FOUNDATION EXCAVATION, RT D/S AREA, CS-0723											
"	VP319	CLAIM - OVERRUN OF DENTAL CONCRETE	09/13/90										
		REMARKS: CLAIM - DENTAL CONCRETE/IMPERVIOUS FILL. CS-0726											
"	VP320	CLAIM - RANDOM II FILL QUANTITY	09/13/90										
		REMARKS: CLAIM - DEFECTIVE SPEC IN RANDOM II IN BORROW. CS-0749											
"	VP321	CLAIM - EMBANKMENT TEMPLATE-1990	09/21/90										
		REMARKS: CLAIM-COST & TIME FOR REVISED EMBANKMENT TEMPLATE, CS-0750											
"	VP322	CLAIM - DELAY DUE TO WELD REPAIRS	10/01/90										
		REMARKS: POT. CLAIM FOR WELD REPAIRS AFTER INSPECTION CS-0805											
"	VP323	CLAIM - FOUNDATION APPROVAL	10/01/90										
		REMARKS: POT. CLAIM FOUNDATION APPROVAL BY GEOTECHNICAL STAFF CS-0806											
"	VP324	CLAIM - ECC CONCRETE FORM SYSTEM DELAYS	12/27/90										
		REMARKS: POT. CLAIM ECC COCNCRETE FORM SYSTEM, CS-0939											
"	VP325	CLAIM - ACCELERATION OF TUNNEL CONCRETE	02/15/91										
		REMARKS: POT. CLAIM -CONTRACTING OFFICER DIRECTED ACCELERATION											
"	VP326	CLAIM - JET FLOW GATE TOLERANCES	02/19/91										
		REMARKS: CLAIM-ASSEMBLED JET FLOW GATE DIMENSIONAL TOLERANCES CS-1012											
"	VP327	CLAIM - QUANTITY OVERRUNS	04/30/91										
		REMARKS: POTENTIAL CLAIM FOR TIME/MONEY DUE TO QTY OVERRUNS, CS-1092											
"	VP328	CLAIM - EXCESS FOUNDATION CLEAN-UP	07/09/91										
		REMARKS: ANALYSIS BY CESPK-CO-RL SL-1152, CS-1195											
"	VP329	CLAIM - LEFT ABUTMENT GROUT LINE	07/31/91										
		REMARKS: ANALYSIS BY CESPK-CO-RL SL-0920,CS-1188											
"	VP330	CLAIM - GOLF COURSE ROAD PAVING	07/24/91				11/16/92		0	DENIED	11/26/92	11/16/92	
		REMARKS: C/S APPEALED DECISION, CESPK-OC REVIEW IN PROCESS.											
"	VP331	CLAIM - PIPELINE BLASTING PLAN	10/14/91										
		REMARKS: CONTRACT NOTIFICATION OF CLAIMS CS-1305, SL-1281, CS-1312											
"	VP332	CLAIM - SPILLWAY SILL EXCAVATION	11/04/91										
		REMARKS: CONTRACTO CLAIMS RE DIRECTED OVEREXCAVATION CS-1340											
"	VP333	CLAIM - SKYLINE BUY AMERICAN SUSPENSION	01/24/92				03/17/92	0	0	P00057	03/26/92	03/30/92	
"	VP334	CLAIM - REMOVAL OF LAMINATED EMBANKMENT	04/20/92										
		REMARKS: CLAIM - REMOVAL OF LAMINATED EMBANKMENT 1992, CS-1468											
"	VP335	CLAIM - PAINT PC STOPLOGS	05/13/92		05/05/92	4,443							
		REMARKS: CLAIM C-S PAINTED/NOT GALVANIZED STOPLOGS CS-1491											

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A890045	VP336	CLAIM - PC PIPELINE PRESSURE TESTING	06/12/92										
		REMARKS: CLAIM CS SITES DEFECT. SPEC FOR FAILED PIPELINE TEST CS-1510											
"	VP337	CLAIM - SUSPENSION OF WORK - RIPRAP	07/07/92										
		REMARKS: C-S CLAIMS RIPRAP MEETS 02271-3.5.1 SL-1527, CS-1582											
"	VP338	CLAIM - BORROW EXCAVATION PAYMENT	04/13/93										
		REMARKS: CLAIM FOR TEMPORARY EXCAVATION IN BORROW AREA CS-1724											
"	VP900I	WEATHER TIME EXTENSION-MAY 1992	06/09/92				06/09/92		6	P00061	07/01/92	07/07/92	
"	VP900II	WEATHER TIME EXTENSION - MAY 1992 (C.O.)	07/31/92	06/09/92	06/25/92	0	07/23/92	0	0	P00065	07/23/92	07/23/92	
"	VP901	ADDITIONAL (Continuing) FUNDS	07/23/92	07/23/92	07/23/92	0	07/23/92	0	0	P00063	07/23/92	07/23/92	
"	VP902	ADDITONAL (Conrinuing) FUNDS	08/27/92	08/27/92	08/27/92	0	08/27/92	0	0	P00068	09/02/92	09/02/92	
"	VP903	ADDITIONAL (Continuing) FUNDS	10/15/92	10/15/92	10/15/92	0	10/15/92	0	0	P00072	10/15/92	10/15/92	
"	VP904	ADDITIONAL (Continuing) FUNDS	01/15/93	01/15/93	01/15/93	0	01/15/93	0	0	P00076	01/15/93	01/15/93	
"	VP990	PROMPT PAYMENT ACT	05/26/89				05/26/89	0	0	P00001	05/26/89	06/13/89	
"	VP991	CHANGE RESIDENT OFFICE ADDRESS	06/15/89				07/06/89	0	0	P00002	07/06/89	07/06/89	
"	VP992	CANCELLED	06/15/89		06/15/89	0	07/23/89	0	0	CANCEL	07/23/89	07/23/89	
"	VP993	WEATHER TIME EXTENSION - NOVEMBER 1989	01/23/90		01/04/90	0	02/07/90	0	3	P00009	02/27/90	06/27/90	
"	VP994	CONTRACTOR ADDRESS CHANGE	08/07/90	08/07/90	08/07/90	0	08/15/90	0	0	P00023	08/15/90	08/07/90	
"	VP995	WEATHER TIME EXTENSION - JULY 1990	08/17/90	08/17/90	08/17/90	0	08/27/90	0	2	P00024	08/27/90	10/10/90	
"	VP996	WEATHER TIME EXTENSION - AUGUST 1990	11/09/90	11/09/90	10/04/90	0	11/09/90	0	3	P00028	11/13/90	01/17/91	
"	VP997	WEATHER TIME EXTENSION - NOVEMBER 1990	01/02/91	02/05/91	02/13/91	0	10/10/91	0	221	P00048	10/29/91	10/29/91	
"	VP998	CONTRACTOR ADDRESS CHANGE - PAYMENTS	08/16/91	08/16/91	08/16/91	0	08/16/91	0	0	P00043	08/16/91	08/16/91	
"	VP999	ADDITIONAL (Continuing) FUNDING	06/09/92	06/09/92	06/09/92	0	06/09/92	0	0	P00060	06/17/92	06/09/92	
A910084	VP001	POSTPONE VISTA MEADOWS PLANTING	06/24/91	07/09/91	10/08/91	4,187	10/18/91	3,280	0	P00001	10/25/91	10/30/91	
"	VP002	PLANT SUBSTITUTIONS	06/24/91	07/10/91	07/23/91	124	12/04/91	-1,075	0	P00002	12/10/91	12/16/91	
"	VP003	LIVESTOCK FENCING JORDAN RIVER SITE 2A	08/27/91	05/13/92	06/19/92	28,157	07/21/92	28,640	122	P00004	07/22/92	07/27/92	
"	VP004	WEATHER TIME EXTENSION - 1991 SEASON	05/21/92	11/19/91	05/07/92	0	05/07/92	0	183	P00003	06/02/92	06/05/92	
"	VP005	ADDITIONAL PLANTING - PARLEY'S CREEK	08/20/92	08/26/92	09/18/92	193,361	09/22/92	0	0	CANCEL	09/22/92	09/22/92	
"	VP006	DELETE PARLEY'S CREEK PLANTING	09/22/92	09/22/92	09/24/92	-35,168	03/15/93	-37,100	0	P00006	03/31/93	04/26/93	
"	VP007	GEOLOGIC EXPLORATION IMPACT	09/29/92	09/29/92	09/29/92	2,550	09/29/92	2,550	0	P00005	10/16/92	10/21/92	
"	VP008	PONY EXPRESS BORROW	10/27/92	10/08/92	10/08/92	1,494	03/15/93	1,494	0	P00007	03/18/93	03/24/93	

TOTAL RECORDS - 173

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APPENDIX IV

CONTRACTOR'S ACTIVE EQUIPMENT LIST

APPENDIX IV

CONTRACTOR'S ACTIVE EQUIPMENT LIST
August 1992

EQUIP. NO.	MODEL	MAKE	SERIAL NO.
10106	631E SCRAPER	CAT	1AB1316
10107	631E SCRAPER	CAT	1AB01317
10108	631E SCRAPER	CAT	1AB1320
10109	631E SCRAPER	CAT	1AB01319
10110	631E SCRAPER	CAT	1AB-01328
10111	631E SCRAPER	CAT	1AB-01335
10112	631E SCRAPER	CAT	1AB-1354
20002	D1ON RIPPER	CAT	2YD-01485
20003	D1ON RIPPER	CAT	2YD-01486
20103	D9L DOZER	CAT	14Y-03962
20105	D9N DOZER	CAT	1JD-03073
20203	D8N DOZER	CAT	9TC-04341
20204	D8N DOZER	CAT	9TC-04338
20205	D8K DOZER	CAT	77V-13693
20206	D8K DOZER	CAT	77V-14592
20208	D8N DOZER	CAT	9TC-01253
20209	D8K DOZER	CAT	77V-75221
20210	D8L DOZER	CAT	53Y-03389
20403	D6H DOZER	CAT	4RC-02414
20404	D6H DOZER	CAT	3ZF-04008
20406	D6H DOZER	CAT	3ZF-01433
20602	D4H DOZER	CAT	8PB-2385
20701	D7H DOZER	CAT	79Z-0184
30102	950B RUBBER TIRED LOADER	CAT	22V-02528
30103	870 RUBBER TIRED LOADER	TCM	672-00156
30104	950B RUBBER TIRED LOADER	CAT	Z-02499
30108	850 TCM LOADER	MESCO	65200157
30109	850 TCM LOADER	MESCO	65200158
30201	980C RUBBER TIRED LOADER	CAT	63X-08409
30202	966D LOADER/5 CYL	CAT	99Y-04218
30203	966D LOADER		
31101	D75S TRACK LOADER	KOMATSU	26Z-00161
31103	963 TRACK LOADER	CAT	21Z-04131
32001	988B RUBBER TIRED LOADER	CAT	50W-09895
33001	992C RUBBER TIRED LOADER	CAT	49Z-01666
41007	MACK TANDEM	MACK	
41008	MACK TANDEM	RD690S	2M2P198C4JC002175
41009	MACK TANDEM	RD690S	
41010	MACK TANDEM	RD690S	1M2B126C7BA00351
41305	R25 REAR DUMP	EUCLID	74167
41306	R25 REAR DUMP	EUCLID	74196
41402	TANDEM WATER TRUCK	KW	74172
41404	TANDEM 4MG WATER TRUCK	MACK	U686ST6977
41405	769C 8M WATER TRUCK	CAT	1X-2690
41406	TANDEM WATER TRUCK	KW	148176S
41409	621 E 8MG WATER TRUCK	CAT	6AB-01492
41410	769C 8M WATER TRUCK	CAT	1X-2834
41501	769C REAR DUMP	CAT	1X-3491
41502	769C REAR DUMP	CAT	1X-3492
41503	769C REAR DUMP	CAT	1X-3495

EQUIP. NO.	MODEL	MAKE	SERIAL NO.
41504	769C REAR DUMP	CAT	1X-2176
41505	769C REAR DUMP	CAT	1X-1286
41601	773B REAR DUMP	CAT	63W-02616
41602	773B REAR DUMP	CAT	63W-02703
41603	773B REAR DUMP	CAT	63W-02617
41604	773B REAR DUMP	CAT	63W-03021
41605	773B REAR DUMP	CAT	63W-03022
41606	773B REAR DUMP	CAT	63W-03030
41607	773B REAR DUMP	CAT	63W-03032
41608	773B REAR DUMP	CAT	63W-03034
50102	14G GRADER	CAT	96U-07750
50203	140G GRADER	CAT	93U-1328
50302	16G GRADER	CAT	93U-2964
51601	416 BACKHOE	CAT	5PC-7957
51602	416 BACKHOE	CAT	5PC-8324
51701	426 4X4 BACKHOE	CAT	7BC-04154
51702	426 4X4 BACKHOE	CAT	7BC-05341
52602	235C TRACKHOE	CAT	5AF-00847
52603	235C TRACKHOE	CAT	6AF-00603
52702	225DLC TRACKHOE	CAT	2SJ-00252
52703	DH280 TRACKHOE	DAEWOO	4323
52705	225CLC TRACKHOE	CAT	3YD-1311
53001	245 MASS EXC.	CAT	82X-0727
53002	245B MASS EXC.	CAT	6MF00721
53101	EX400LC TRACKHOE	HITACHI	164-2407
54002	DISC 16*36"	ROME	8TRCH-531
54003	DISC	ROME	
54004	DISC	ROME	
54005	DISC	ROME	
54006	DISC	ROME	
54007	DISC	ROME	
54008	DISC MCH 16*36"	REMCO	MCH91-123
54009	DISC	REMCO	
54010	DISC	REMCO	MCH92-137
54025	ROCK RAKE 960D	BALD.	J01710
54026	ROCK RAKE 955B	BALD.	5CA-4811
54027	100KW GEN SET	CAT	9AB-2839
54030	25KW GEN SET	MQ	
54501	WATER TANK		
54601	SCALES-120 TON		
55302	RUBBER TIRED 28 CRANE	GROVE	75580
60102	750 AIR COMPRESSOR	IR	127709 U82 481
60104	750 AIR COMPRESSOR	SULLIVAN	
60105	AIR COMPRESSOR 150 CFM	G-S	13939
60106	750D		550050
61005	350 DRILL	IR	242826
72001	60" BELT	KOLMAN	64-497-60-60
72002	48" BELT	KOLMAN	48-50-59-211
72003	60" BELT	KOCAL	166
72004	60" BELT		
74301	CRUSHER	CEDAR RAPIDS	7AC3648
74302	63 CF CONV. 24"	MARCO	66788-1 2 FRAME
74303	83 CF CONV. 30"	MARCO	66788-2 2 TRUSS

EQUIP. NO.	MODEL	MAKE	SERIAL NO.
74304	TT CONV. 24"	MARCO	66788-3 S-6673
74306	SIZE 4 STARTERS	GE	
74307	SIZE 3 STARTERS	GE	
74308	GRIZZLY	CEDAR RAPIDS	
74501	TITAN SCREEN	REED	
80103	825C ROLLER	CAT	86X-0929
80104	825C ROLLER	CAT	87X-0950
80701	SPF60DD ROLLER	IR (2)	5298
80702	SPF60DD ROLLER	IR	5343
80703	SPF60DD ROLLER	IR	5160
80801	SD 150D ROLLER	IR	6924-S
80901	SD 150D ROLLER	IR	7064-S
81001	50 TN RUBBER TIRED ROLLER	GRACE	W21T-980
82504	MECH TRUCK	CHEVROLET	
84001	LIGHT PLANT	COLEMAN	RD1320
84002	LIGHT PLANT	COLEMAN	RD1283
84003	LIGHT PLANT	MAXILITE	880540
84004	LIGHT PLANT	MAXILITE	880541
84005	LIGHT PLANT	COLEMAN	RD1300
84007	LIGHT PLANT	COLEMAN	RS1319
84020	LIGHT PLANT	ALLMAND	880417
84021	LIGHT PLANT	ALLMAND	900803
84022	LIGHT PLANT	ALLMAND	900804
84023	LIGHT PLANT	ALLMAND	900806
84024	LIGHT PLANT	ALLMAND	804150
84025	LIGHT PLANT	ALLMAND	900805
84026	LIGHT PLANT	AMIDA	8611F-0041
84027	LIGHT PLANT	AMIDA	8611F-0040
84028	LIGHT PLANT	MAXI	910906
84029	LIGHT PLANT	MAXI	911017
84030	LIGHT PLANT	MAXI	911019
84031	LIGHT PLANT	MAXI	911020
84032	LIGHT PLANT	MAXI	900641
84033	LIGHT PLANT	MAXI	900109
84034	LIGHT PLANT	MAXI	900630
84101	DIESEL PUMP 6"		7543817
84102	DIESEL PUMP 6"		847429
85010	LAB TRAILER		

Note:

(1) Early in construction (90 and 91) the hauling equipment distribution was much different. Initially there were few rear dumps and up to 11 ± CAT 631 Scrapers. It was primarily the last construction season the large CAT 769C and 773B rear dumps were utilized.

(2) IR = Ingersol Rand

APPENDIX V

INSTRUMENT DATA SUMMARIES

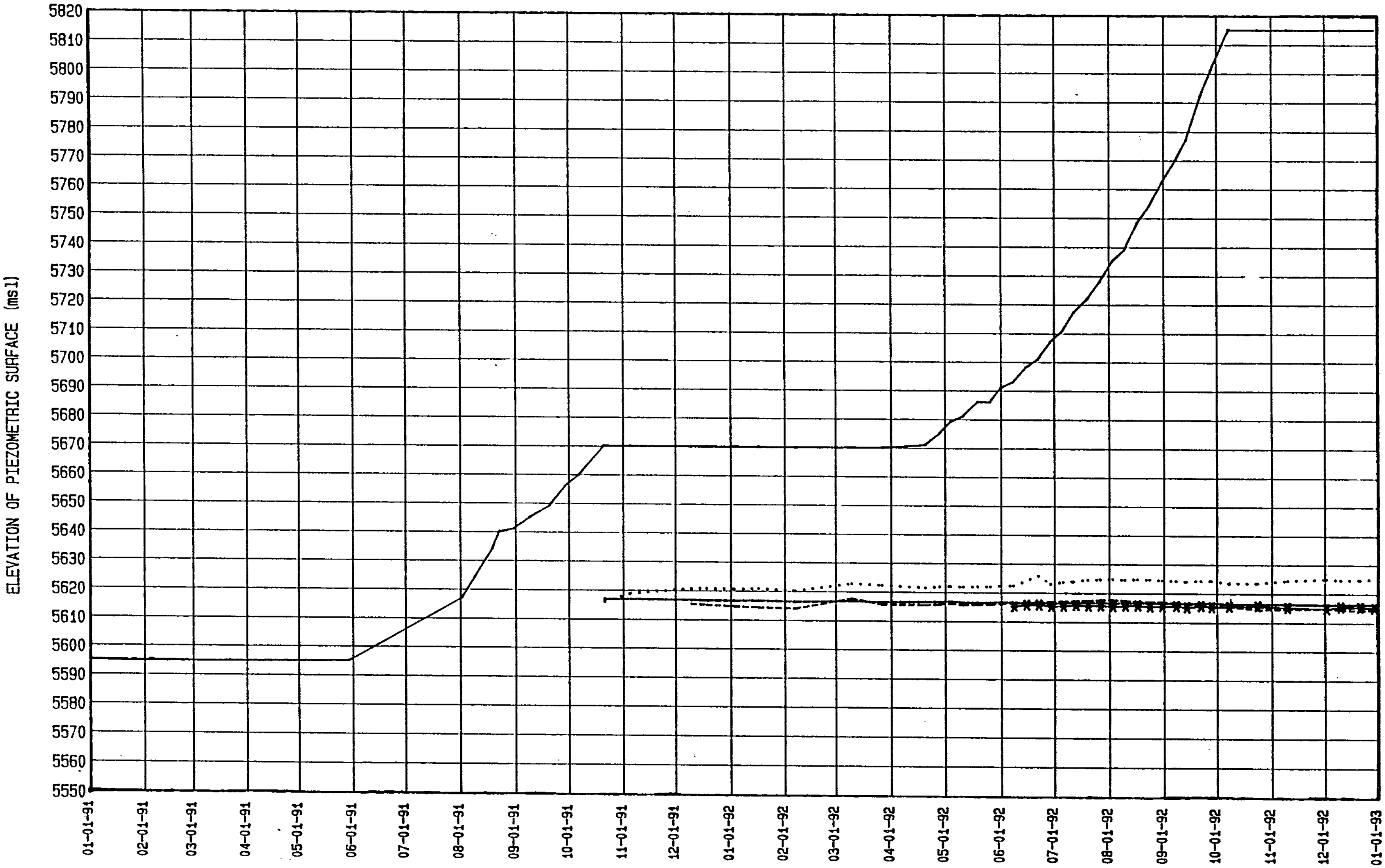
APPENDIX V

Piezometric Data for: Station 13+00 Foundation
Piezometric Data for: Station 15+50 Foundation
Piezometric Data for: Station 18+00 Foundation
Piezometric Data for: Station 20+00 Foundation
Piezometric Data for: Station 23+50 Foundation
Piezometric Data for: U/S Shell - Soil Foundation
Piezometric Data for: D/S Shell - Soil Foundation
Piezometric Data for: Random I - Embankment Piezometers
Piezometric Data for: Random II - Embankment Piezometers
Piezometric Data for: Impervious - Left Embankment
Piezometric Data for: Impervious - Right Embankment
Piezometric Data for: Impervious 18+00 Piezos
Piezometric Data for: Embankment Piezometers with Pore Pressure

Total Settlement Summary through End of Construction

Summary of Inclinometer Data, Section at Station 13+00
Summary of Inclinometer Data, Section at Station 15+50
Summary of Inclinometer Data, Section at Station 18+00
Summary of Inclinometer Data, Section at Station 20+50
Summary of Inclinometer Data, Section at Station 23+50
Summary of Inclinometer Data, Section at Axis of Dam
Summary of Inclinometer Data, Section at 240' U/S
Summary of Inclinometer Data, Section at 300' D/S

Seepage flows

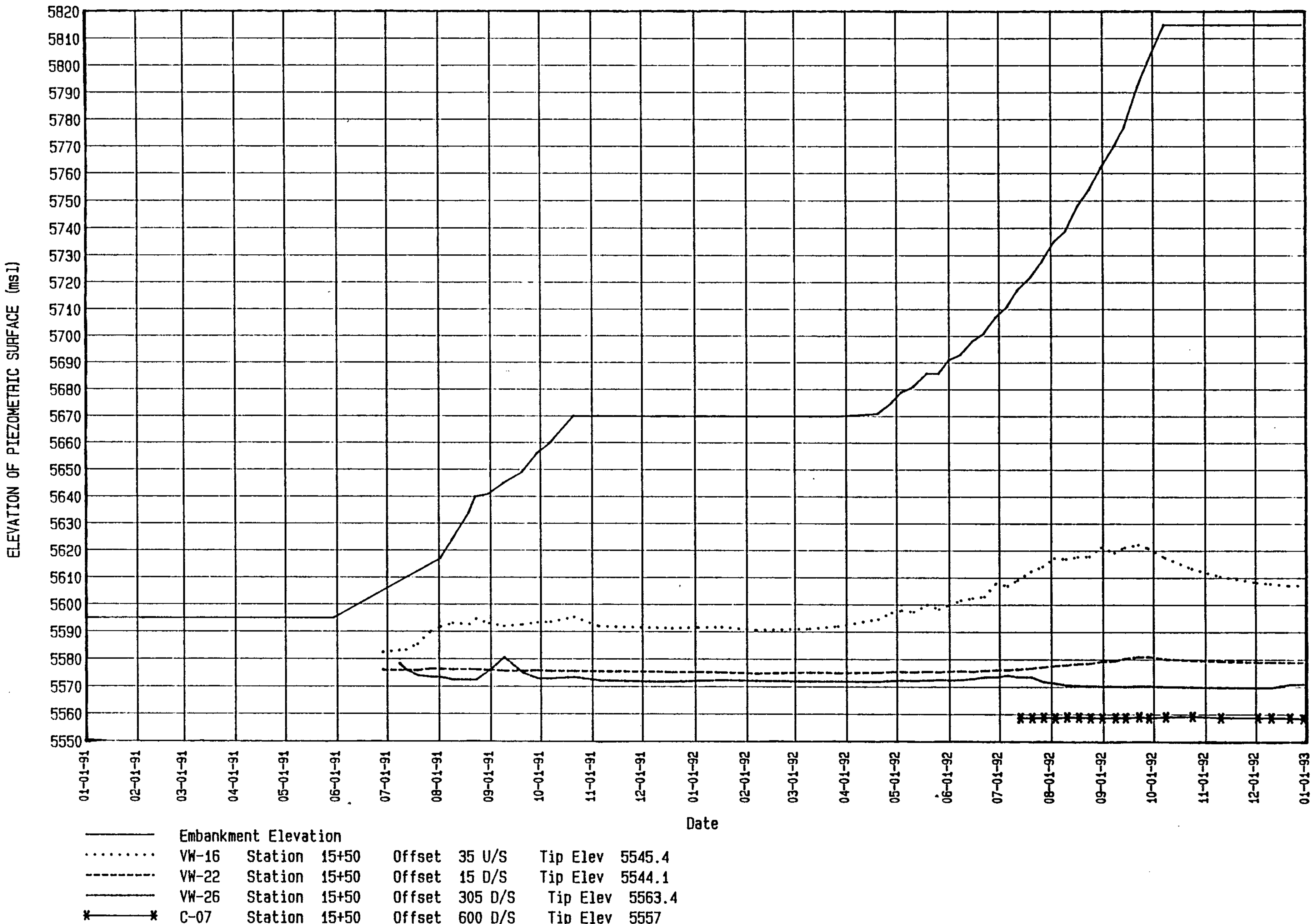


Embankment Elevation							
VW-04	Station	13+00	Offset	35 U/S	Tip Elev	5605.4
VW-10	Station	13+00	Offset	15 D/S	Tip Elev	5609.6
VW-11	Station	13+00	Offset	205 D/S	Tip Elev	5616.2
C-03	Station	13+00	Offset	420 D/S	Tip Elev	5616.2

LITTLE DELL DAM

Piezometric Data for : STATION 1300 FOUNDATION

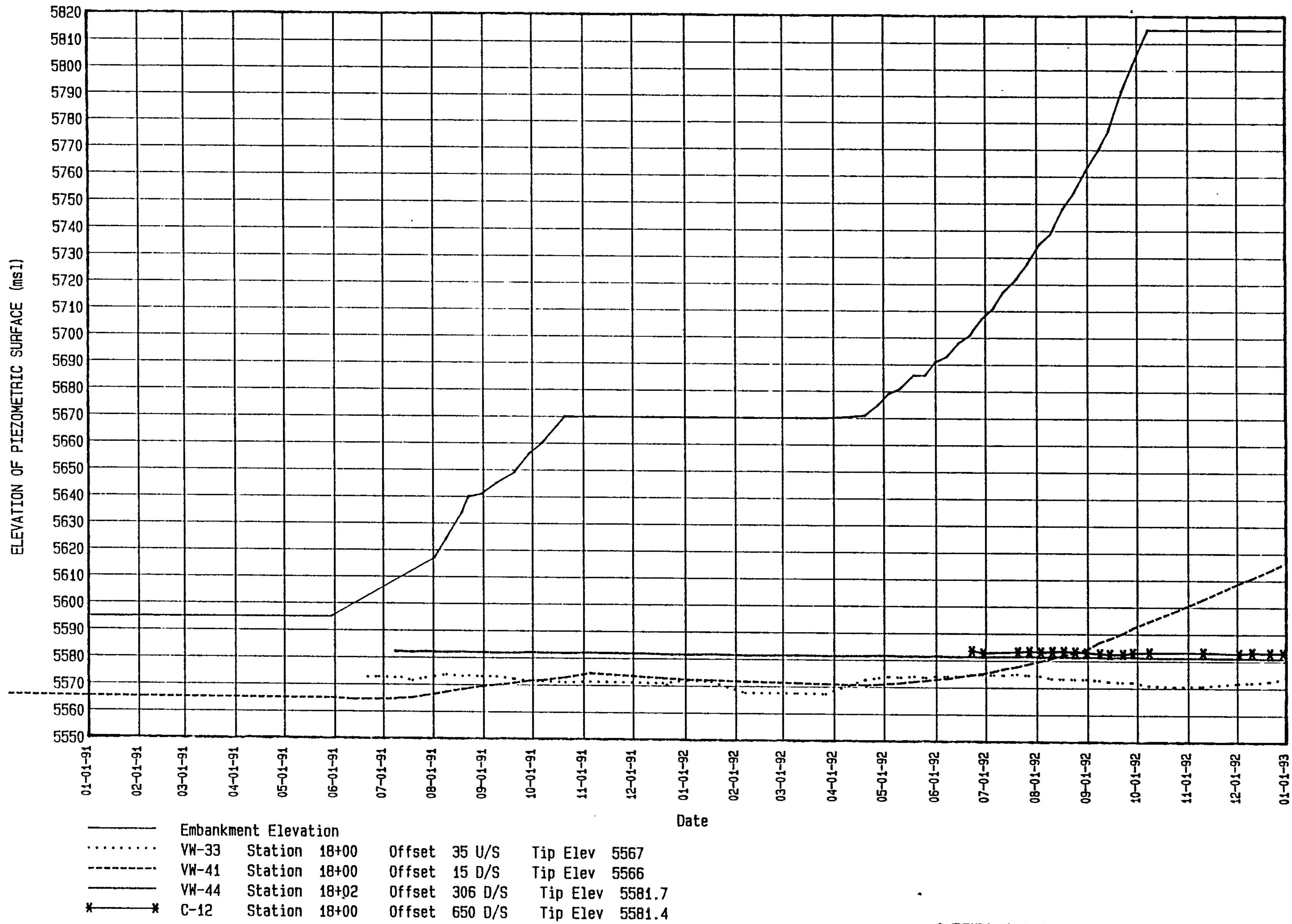
PLATE



LITTLE DELL DAM

Piezometric Data for : STATION 1550 FOUNDATION

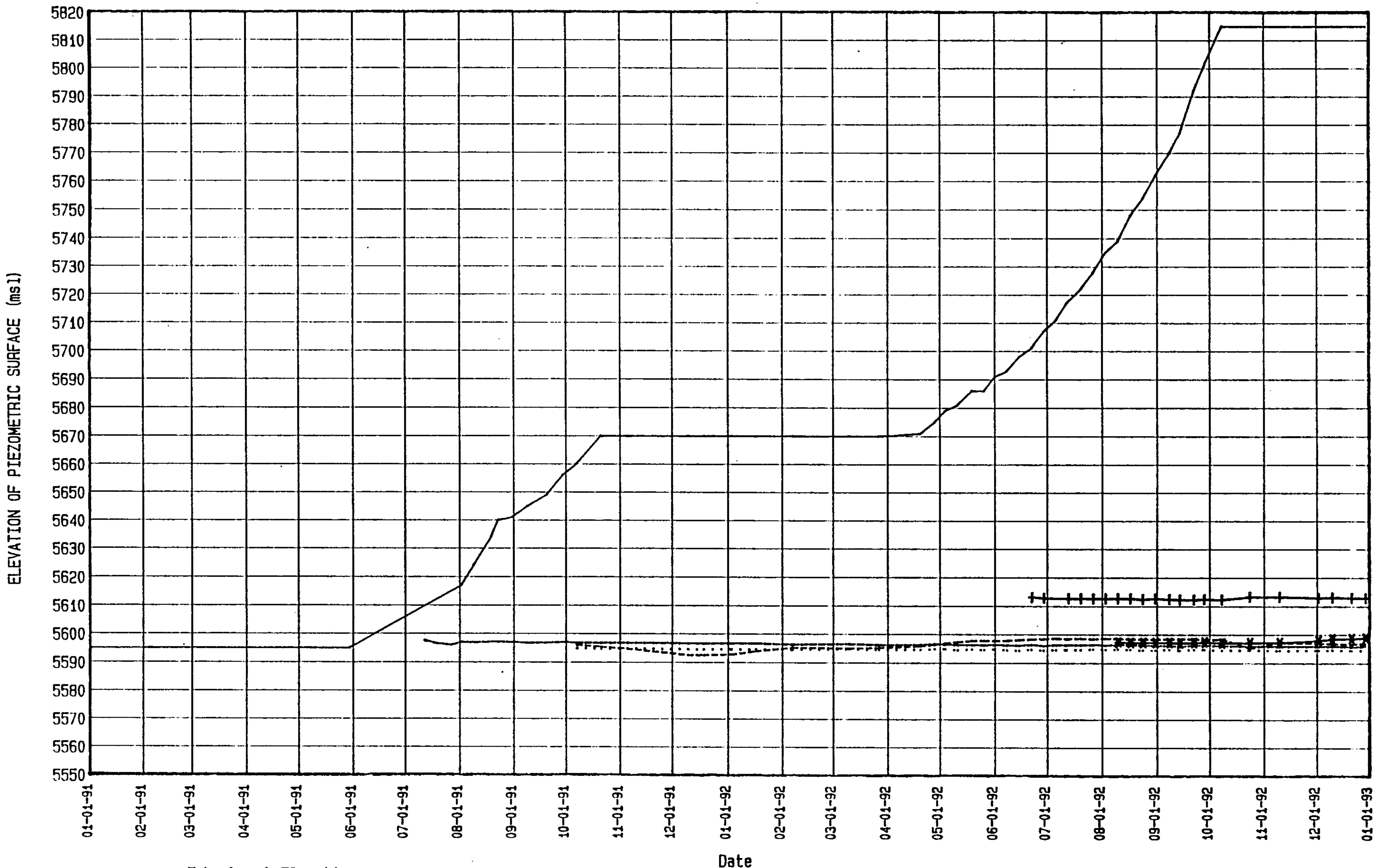
PLATE



LITTLE DELL DAM

Piezometric Data for : STATION 1800 FOUNDATION

PLATE

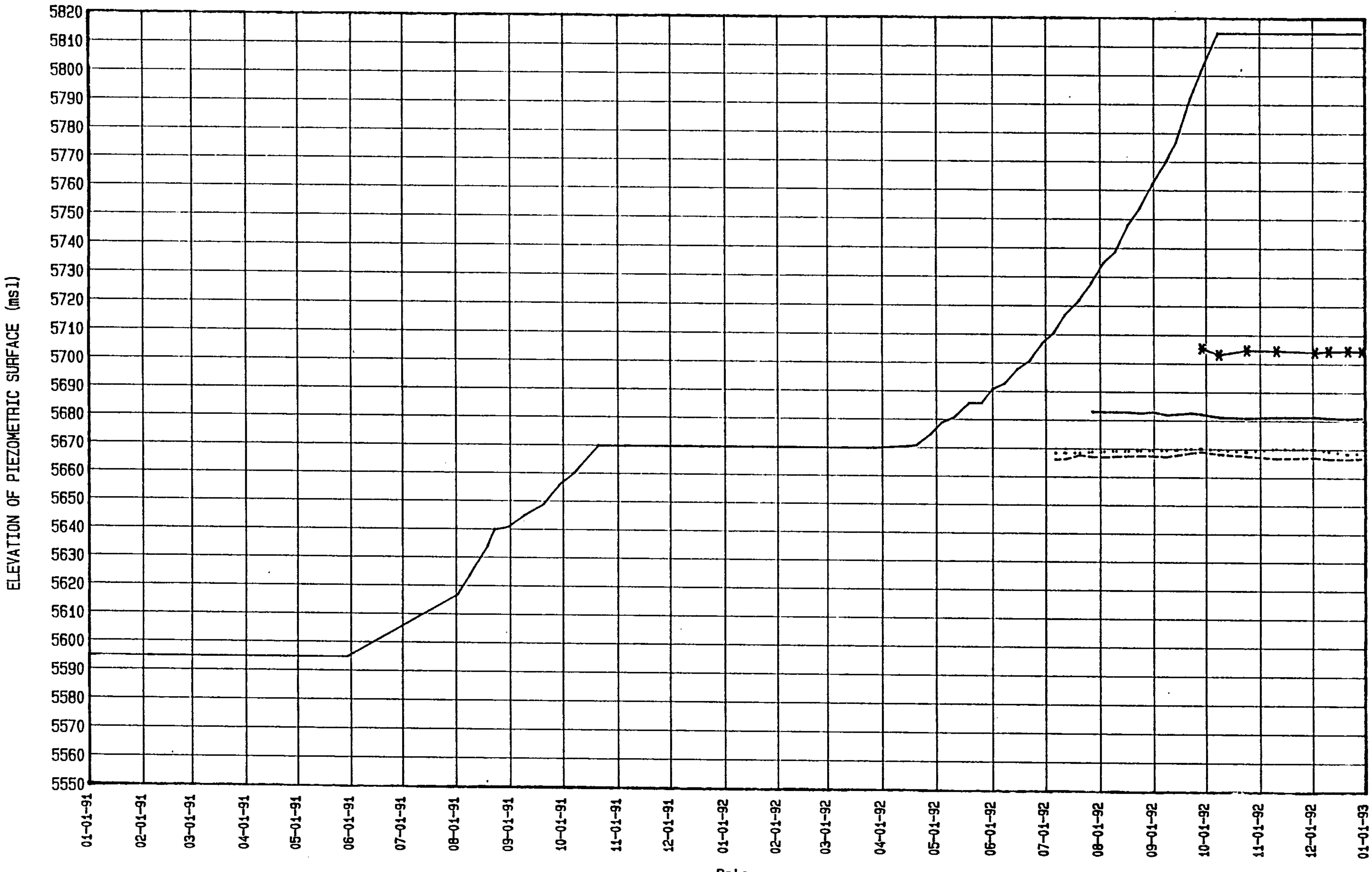


Embankment Elevation
VW-49 Station 20+50 Offset 35 U/S Tip Elev 5593.4
VW-58 Station 20+50 Offset 15 D/S Tip Elev 5590.3
VW-60 Station 20+50 Offset 305 D/S Tip Elev 5596.3
C-15 Station 20+50 Offset 305 D/S Tip Elev 5595.7
C-17 Station 20+50 Offset 550 D/S Tip Elev 5610.8

LITTLE DELL DAM

Piezometric Data for : STATION 2050 FOUNDATION

PLATE

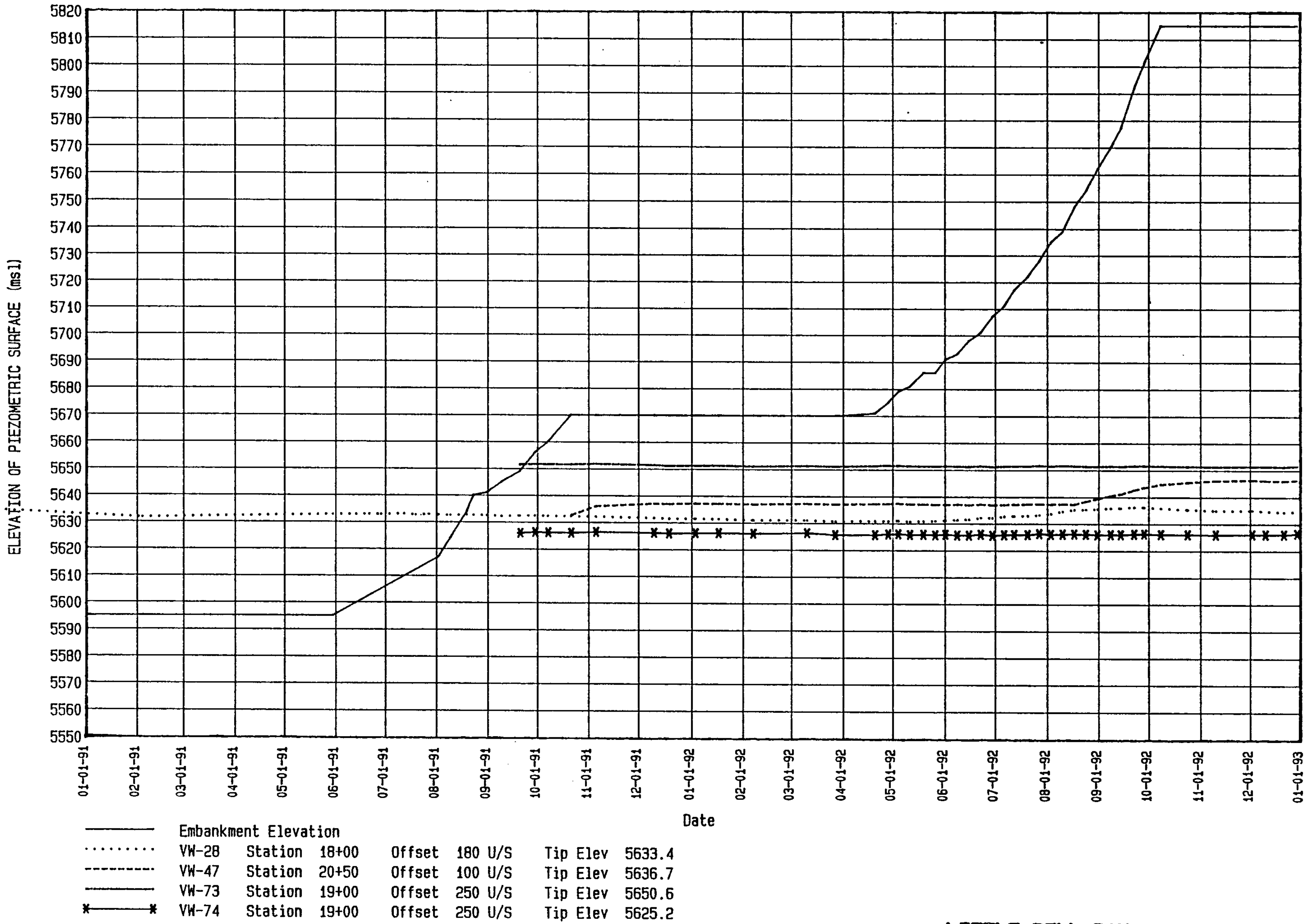


Embankment Elevation				
VW-64	Station 23+50	Offset 35 U/S	Tip Elev 5650.3	
VW-70	Station 23+50	Offset 15 D/S	Tip Elev 5650	
VW-71	Station 23+45	Offset 95 D/S	Tip Elev 5681	
C-21	Station 23+50	Offset 400 D/S	Tip Elev 5695.4	

LITTLE DELL DAM

Piezometric Data for : STATION 2350 FOUNDATION

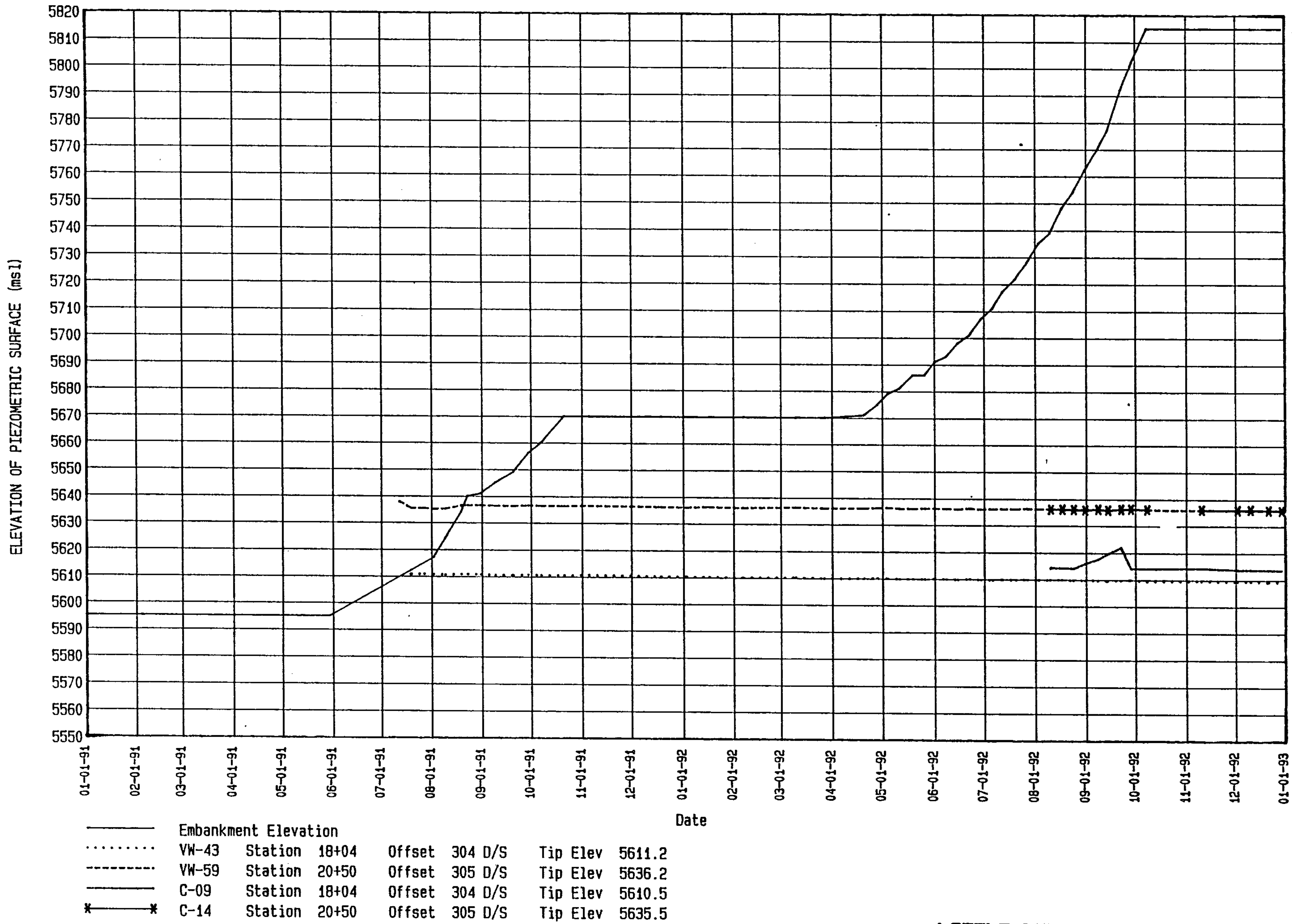
PLATE



LITTLE DELL DAM

Piezometric Data for : U/S SOIL FOUNDATION

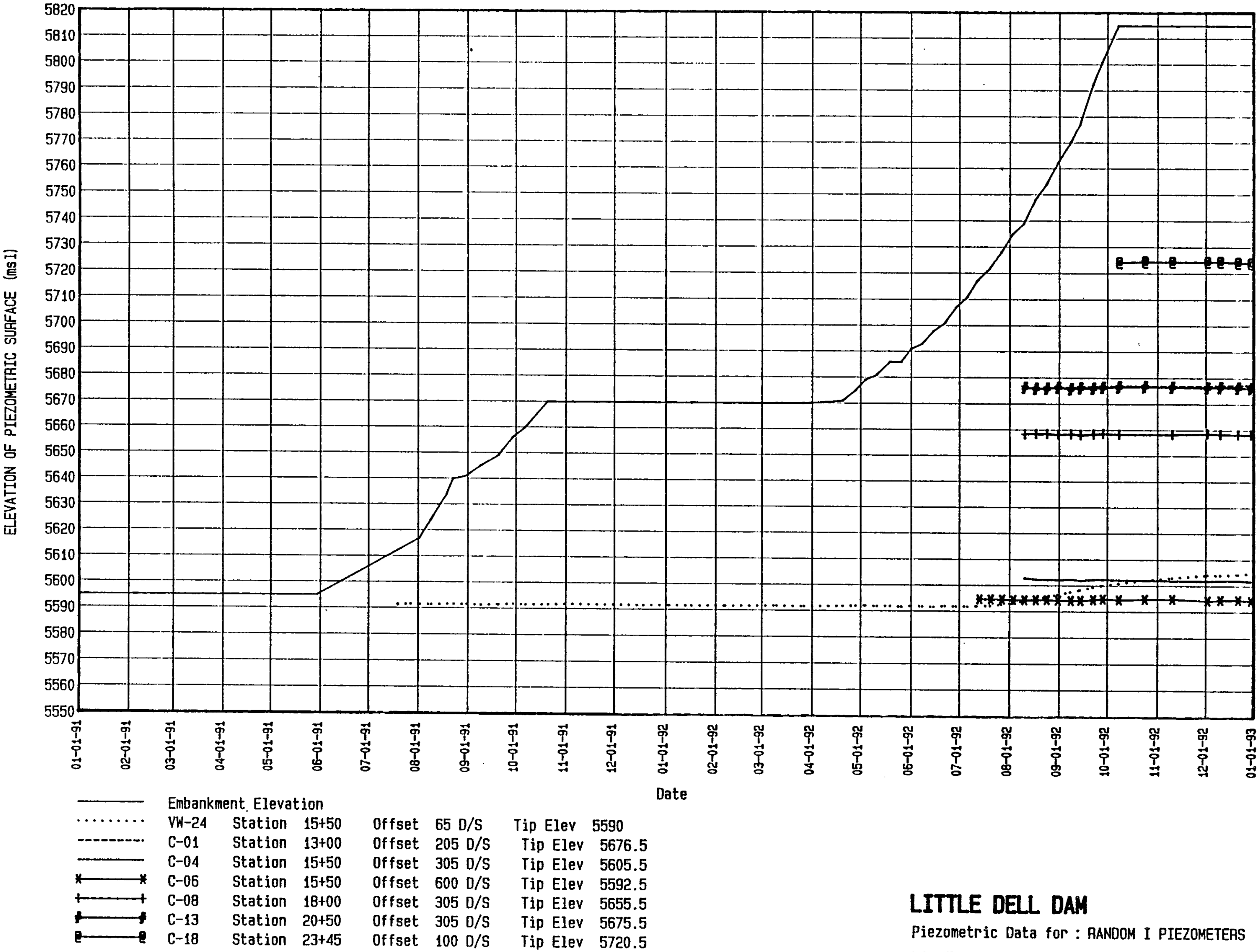
PLATE



LITTLE DELL DAM

Piezometric Data for : D/S SOIL FOUNDATION

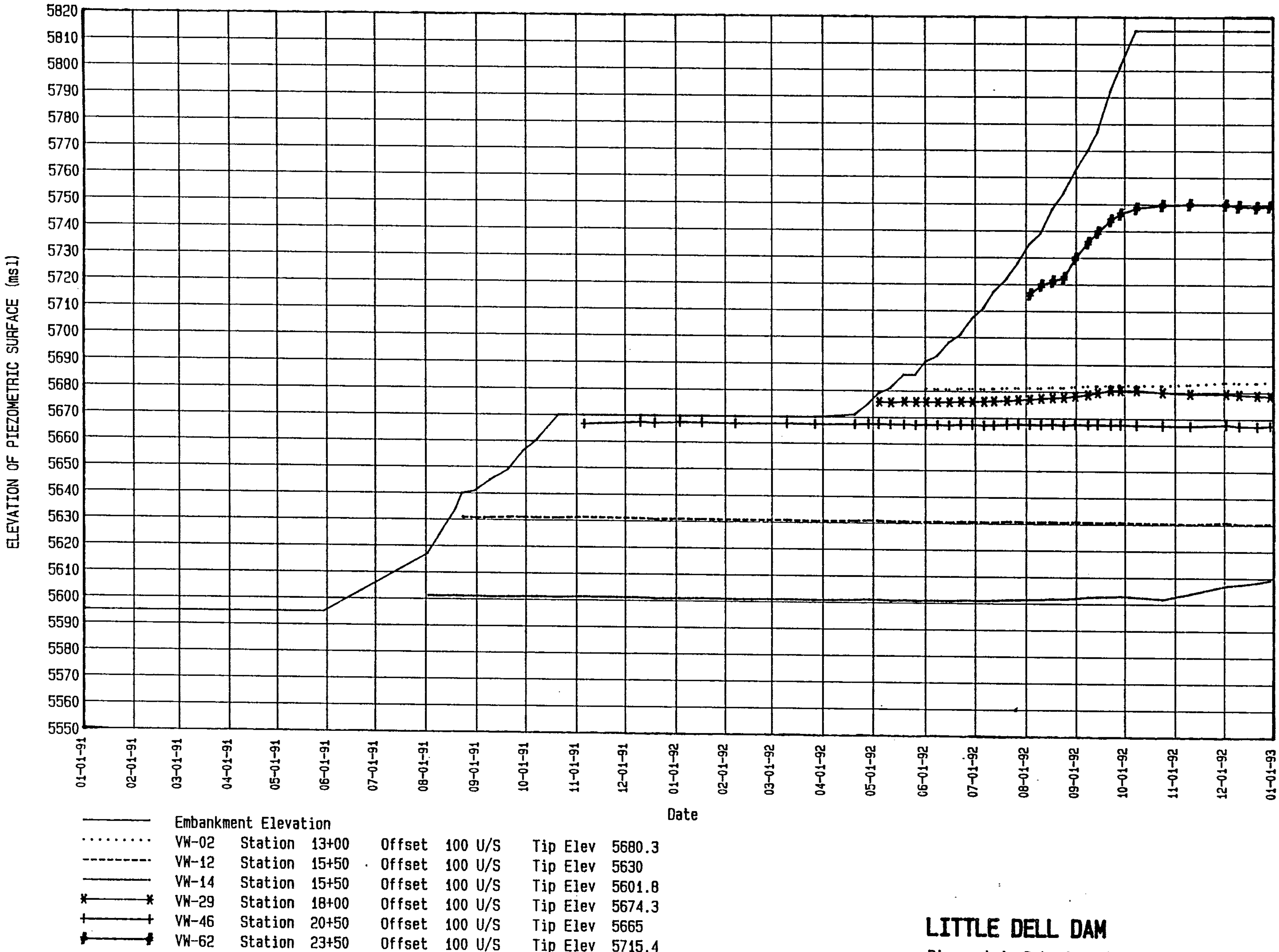
PLATE



LITTLE DELL DAM

Piezometric Data for : RANDOM I PIEZOMETERS

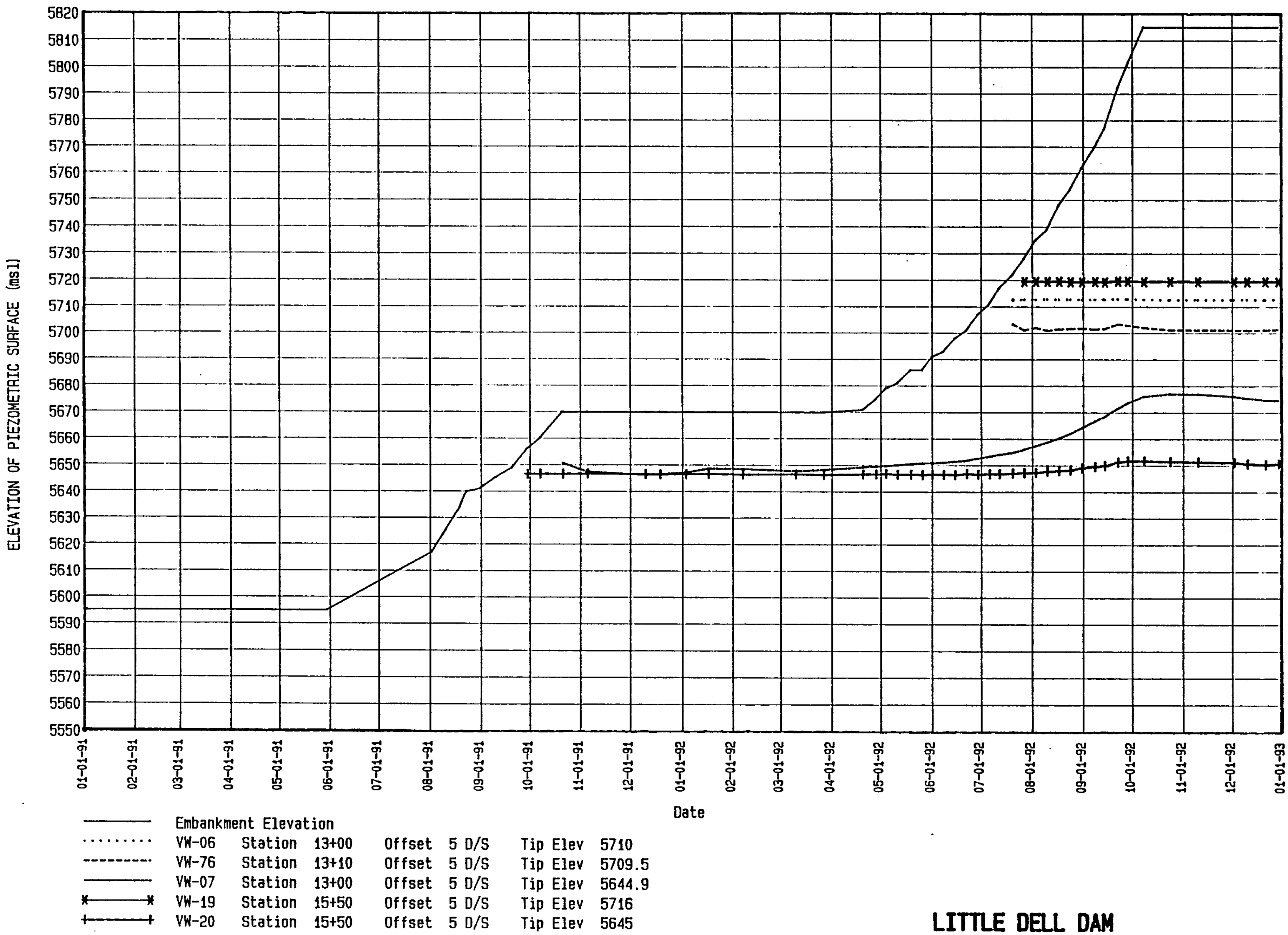
PLATE



LITTLE DELL DAM

Piezometric Data for : RANDOM II PIEZOMETERS

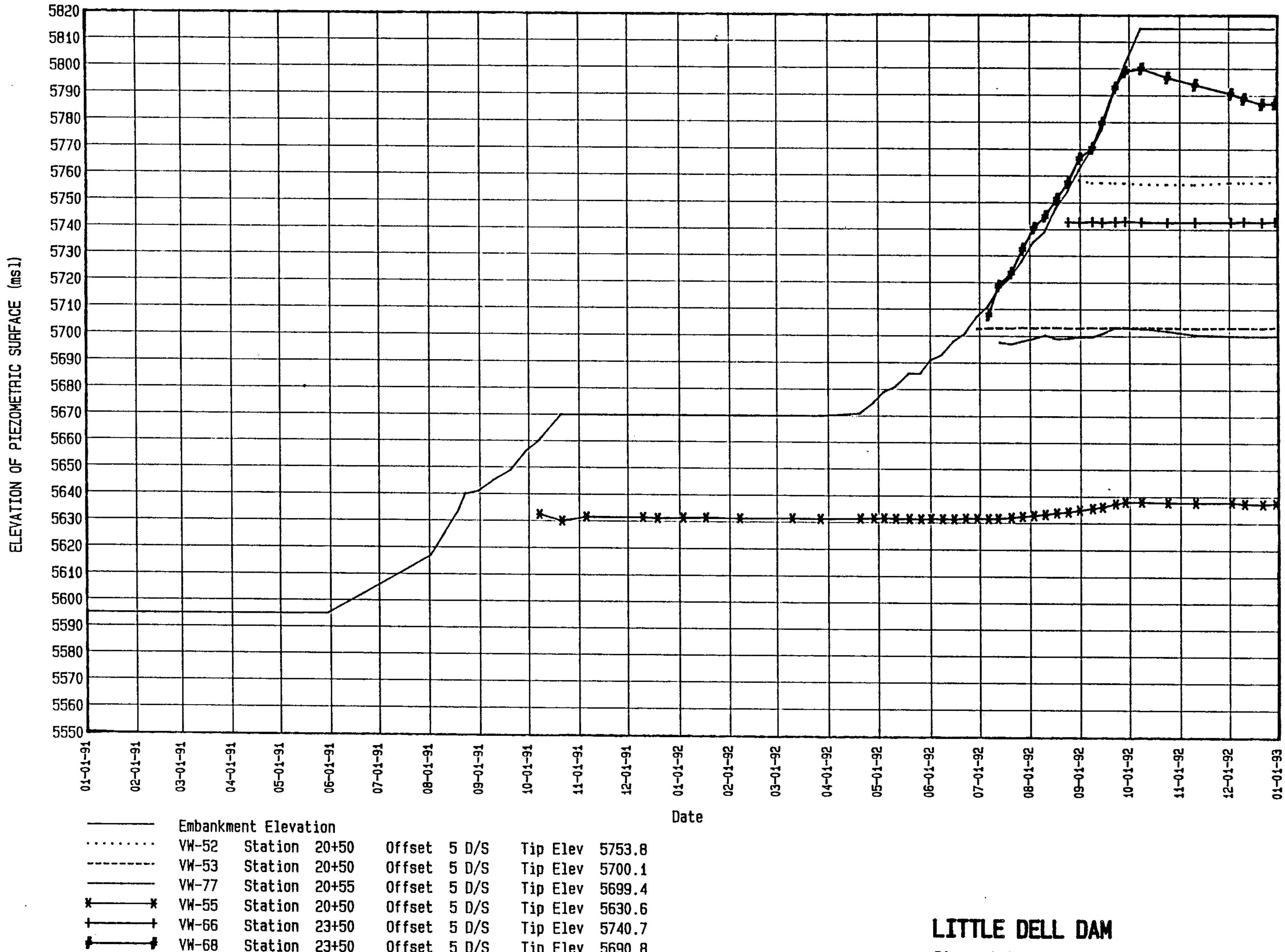
PLATE



LITTLE DELL DAM

Piezometric Data for : IMPERVIOUS LEFT PIEZOS

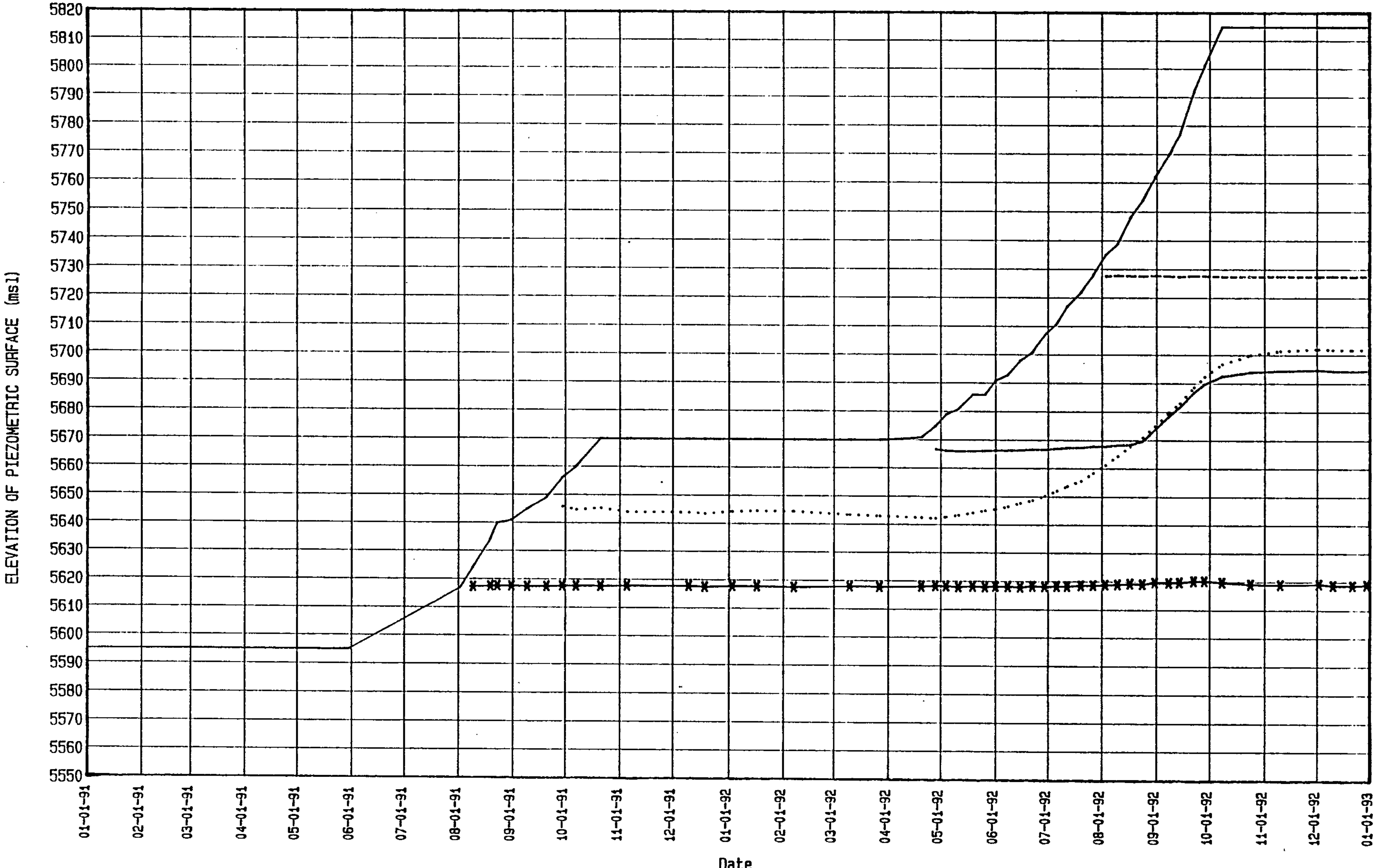
PLATE



LITTLE DELL DAM

Piezometric Data for : IMPERVIOUS RIGHT PIEZOS

PLATE

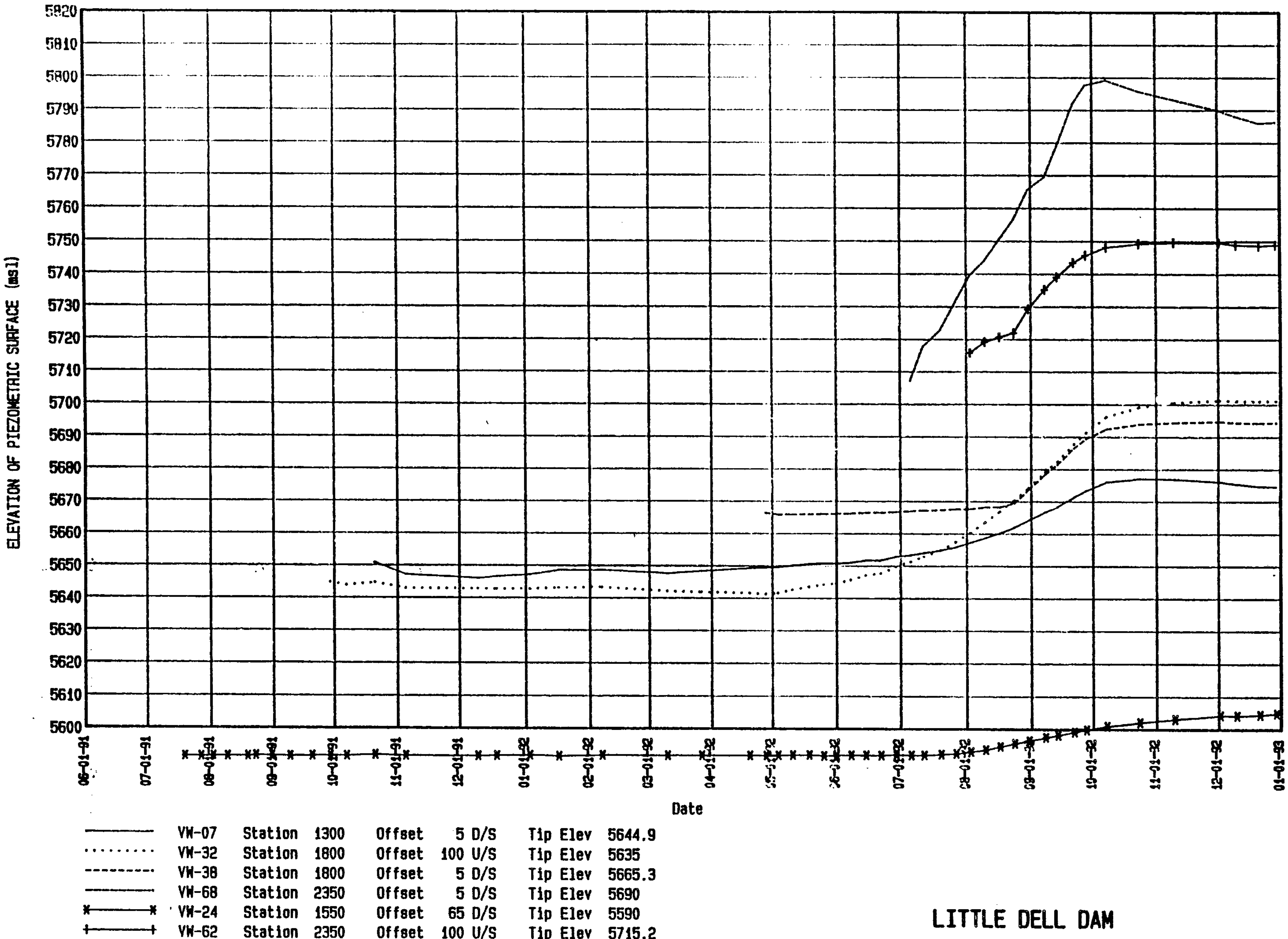


Embankment Elevation						
VW-31	Station	18+00	Offset	100 U/S	Tip Elev	5635.8
VW-36	Station	18+00	Offset	5 D/S	Tip Elev	5725.6
VW-38	Station	18+00	Offset	5 D/S	Tip Elev	5665.3
VW-40	Station	18+00	Offset	5 D/S	Tip Elev	5615.2

LITTLE DELL DAM

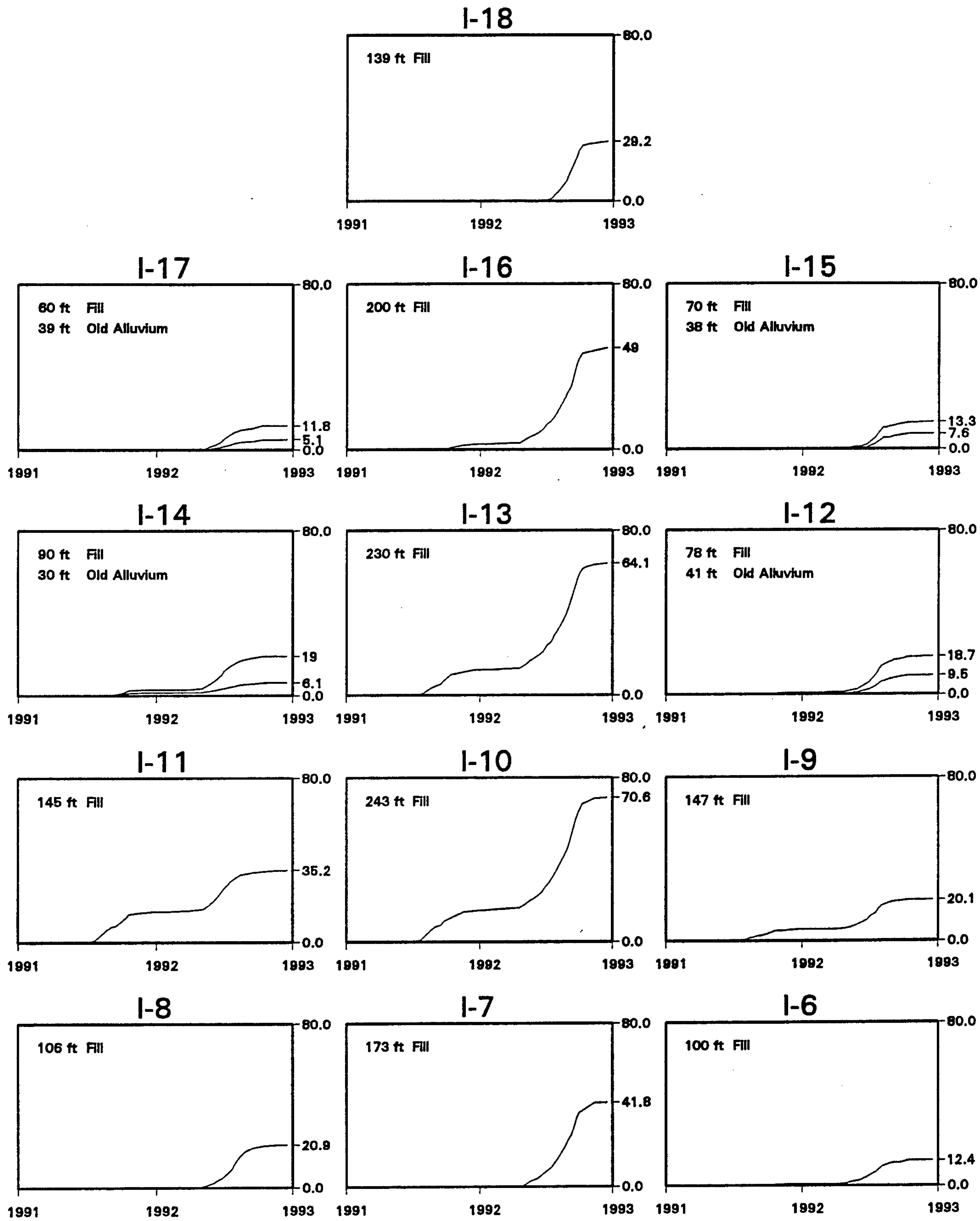
Piezometric Data for : IMPERVIOUS 18+00 PIEZOS

PLATE



LITTLE DELL DAM

Piezometric Data for : EMB PIEZOS WITH PORE PRESSURE

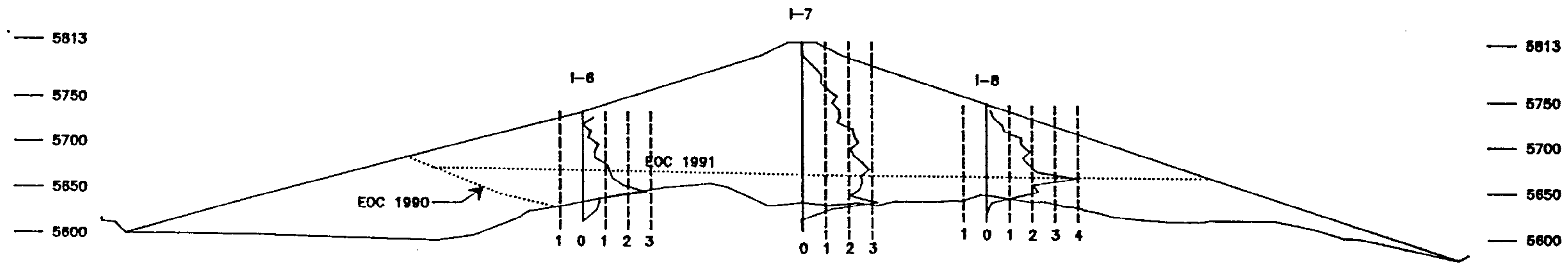


LITTLE DELL DAM

Total Settlement Summary (inches)
Through End of Construction

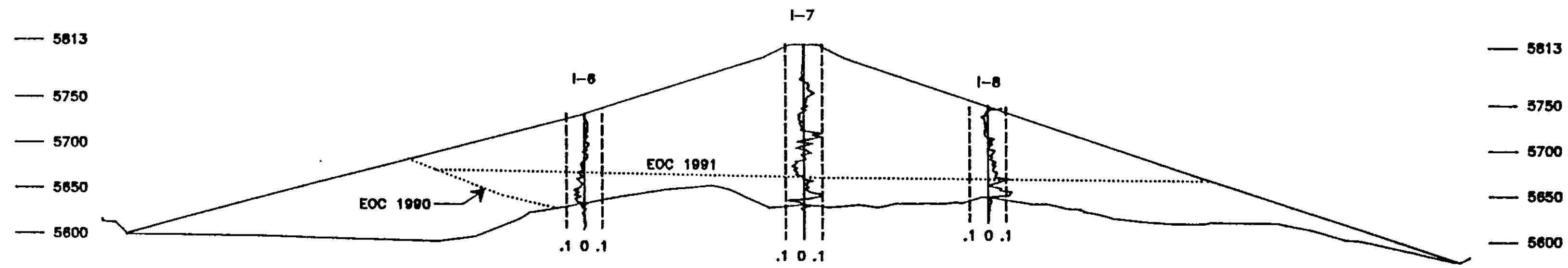
PLATE

SETTLEMENT (IN INCHES)



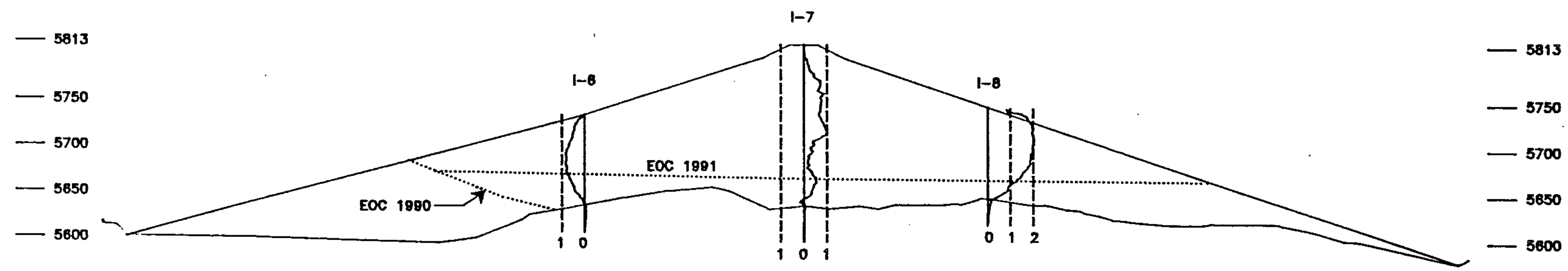
Values of Settlement are the amount of joint closure between casings.

INCREMENTAL MOVEMENT (IN INCHES)



Incremental Movements are the horizontal deflections experienced at specific points within the inclinometer casing. There are 5 points within each 10 foot section and 3 points within each 5 foot section.

CUMULATIVE MOVEMENT (IN INCHES)

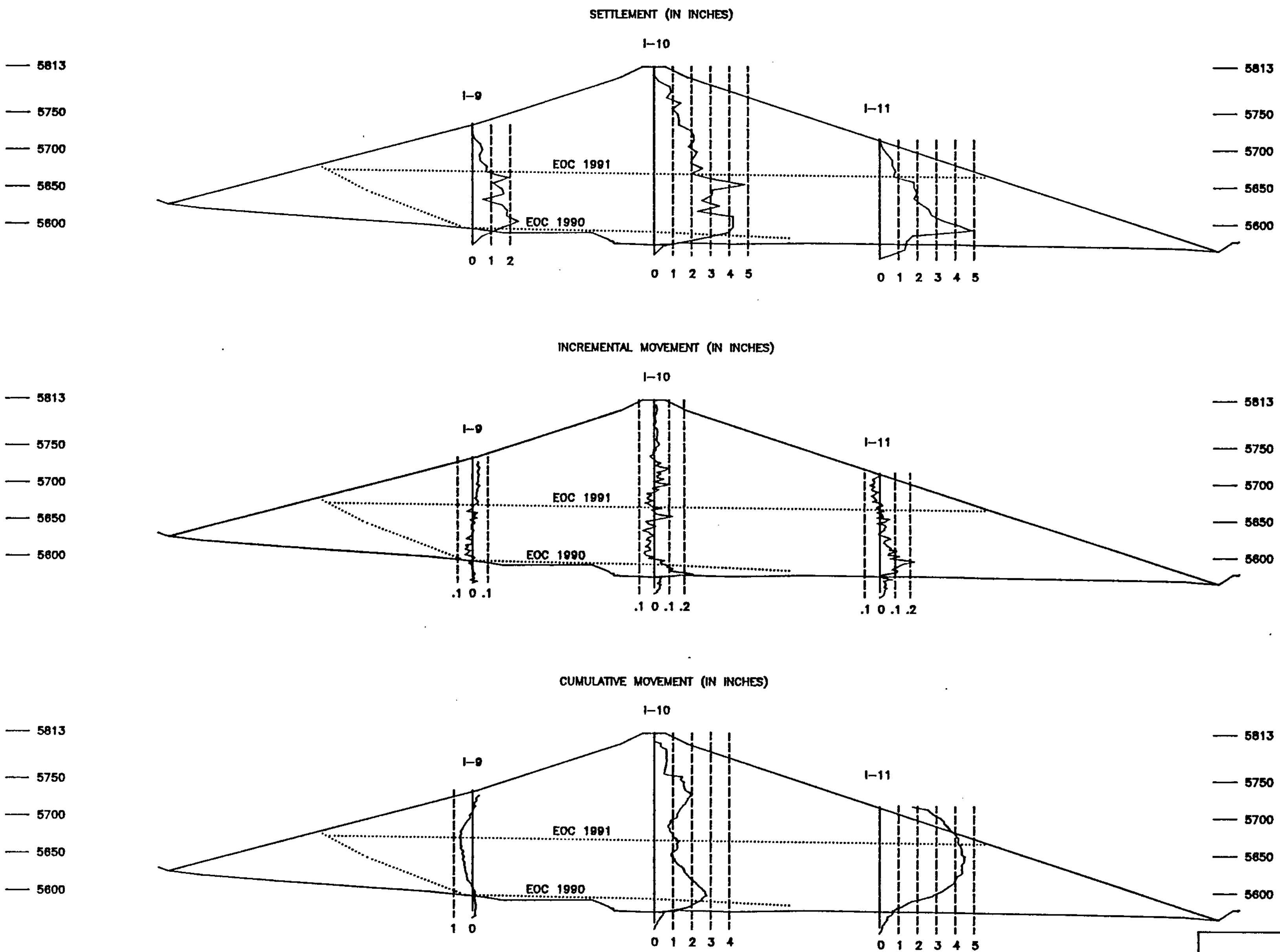


Cumulative movements during construction reflect the additive effect of the incremental movements.

LITTLE DELL DAM

Summary of Inclinometer Data
Section at Station 13+00

[redacted]



Values of Settlement are the amount of joint closure between casings.

Incremental Movements are the horizontal deflections experienced at specific points within the inclinometer casing. There are 5 points within each 10 foot section and 3 points within each 5 foot section.

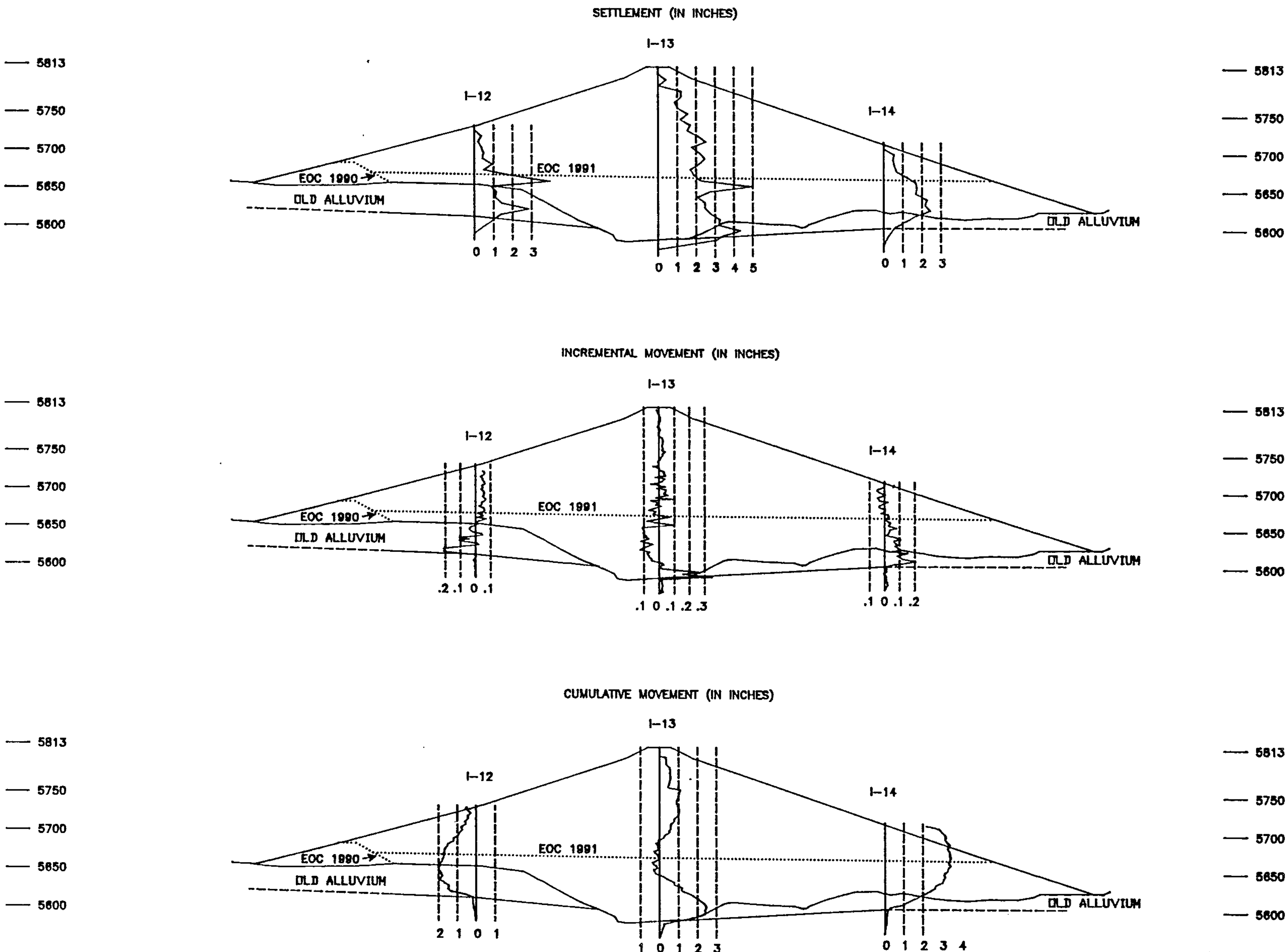
Cumulative movements during construction reflect the additive effect of the incremental movements.

——— End of Construction – 10-12-92

LITTLE DELL DAM

Summary of Inclinometer Data
Section at Station 15+50

Plate



Values of Settlement are the amount of joint closure between casings.

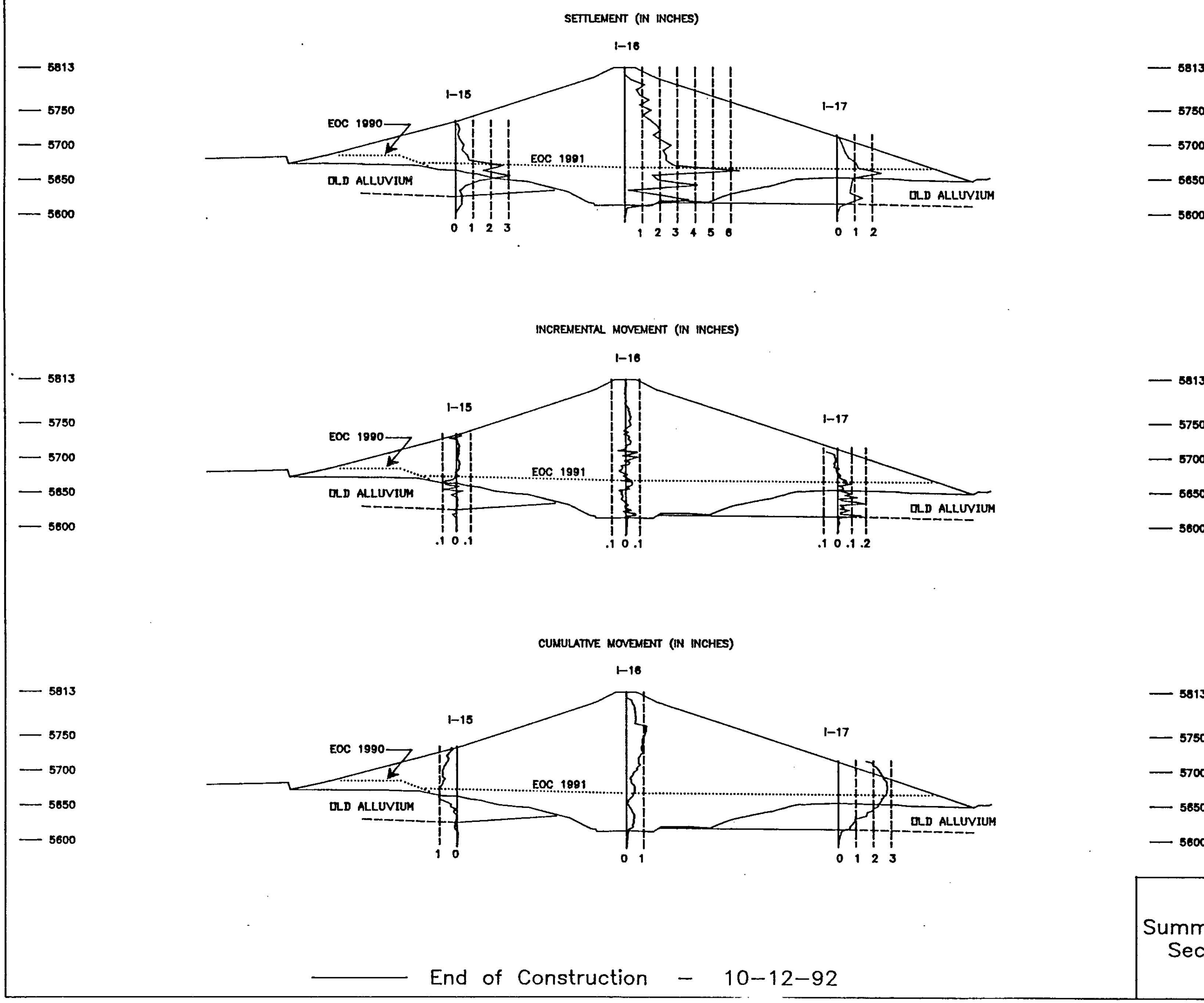
Incremental Movements are the horizontal deflections experienced at specific points within the inclinometer casing. There are 5 points within each 10 foot section and 3 points within each 5 foot section.

Cumulative movements during construction reflect the additive effect of the incremental movements.

LITTLE DELL DAM

Summary of Inclinometer Data
Section at Station 18+00

[redacted]d o[redacted]ons[redacted]tion[redacted]12-[redacted] [redacted]ate[redacted]



Values of Settlement are the amount of joint closure between casings.

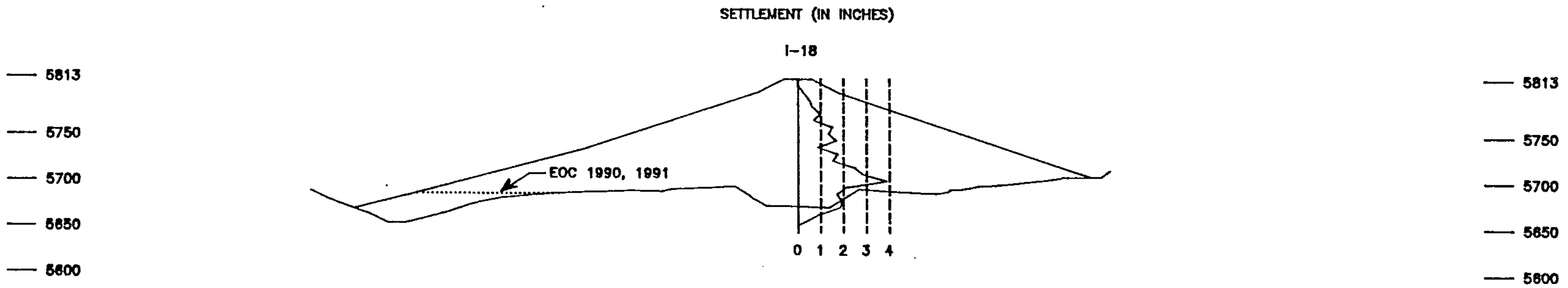
Incremental Movements are the horizontal deflections experienced at specific points within the inclinometer casing. There are 5 points within each 10 foot section and 3 points within each 5 foot section.

Cumulative movements during construction reflect the additive effect of the incremental movements.

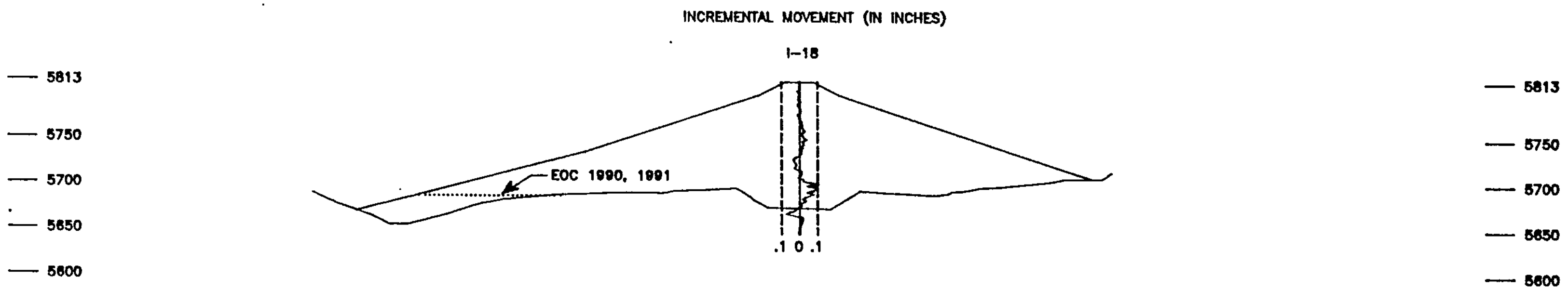
LITTLE DELL DAM

Summary of Inclinometer Data
Section at Station 20+50

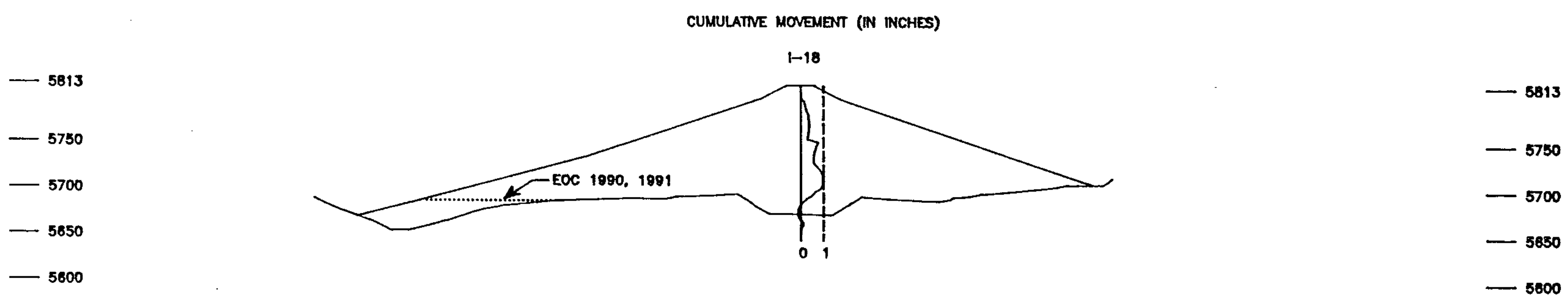
Plate



Values of Settlement are the amount of joint closure between casings.



Incremental Movements are the horizontal deflections experienced at specific points within the inclinometer casing. There are 5 points within each 10 foot section and 3 points within each 5 foot section.



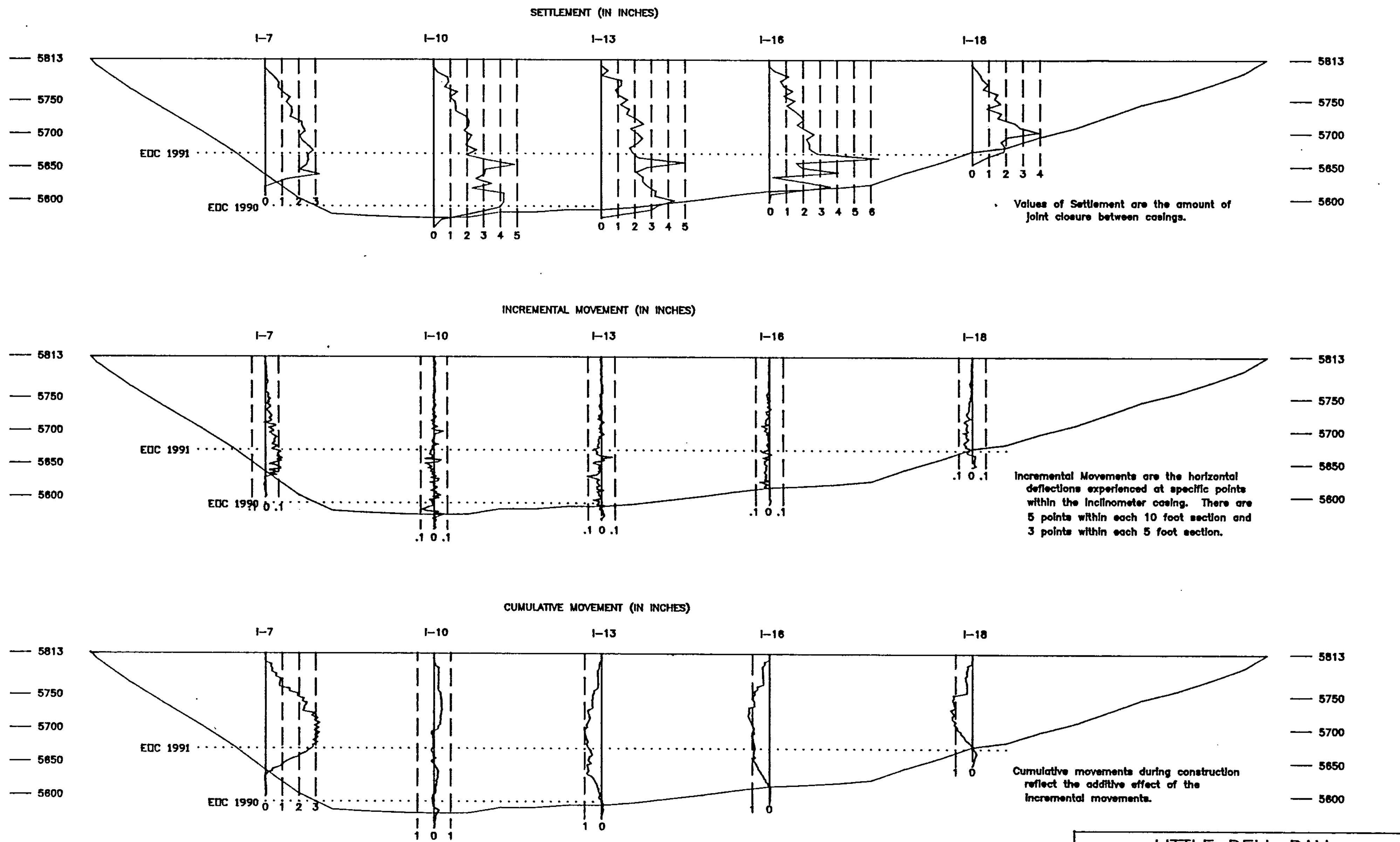
Cumulative movements during construction reflect the additive effect of the incremental movements.

LITTLE DELL DAM

Summary of Inclinometer Data
Section at Station 23+50

End of Construction 10-12-92

Plate

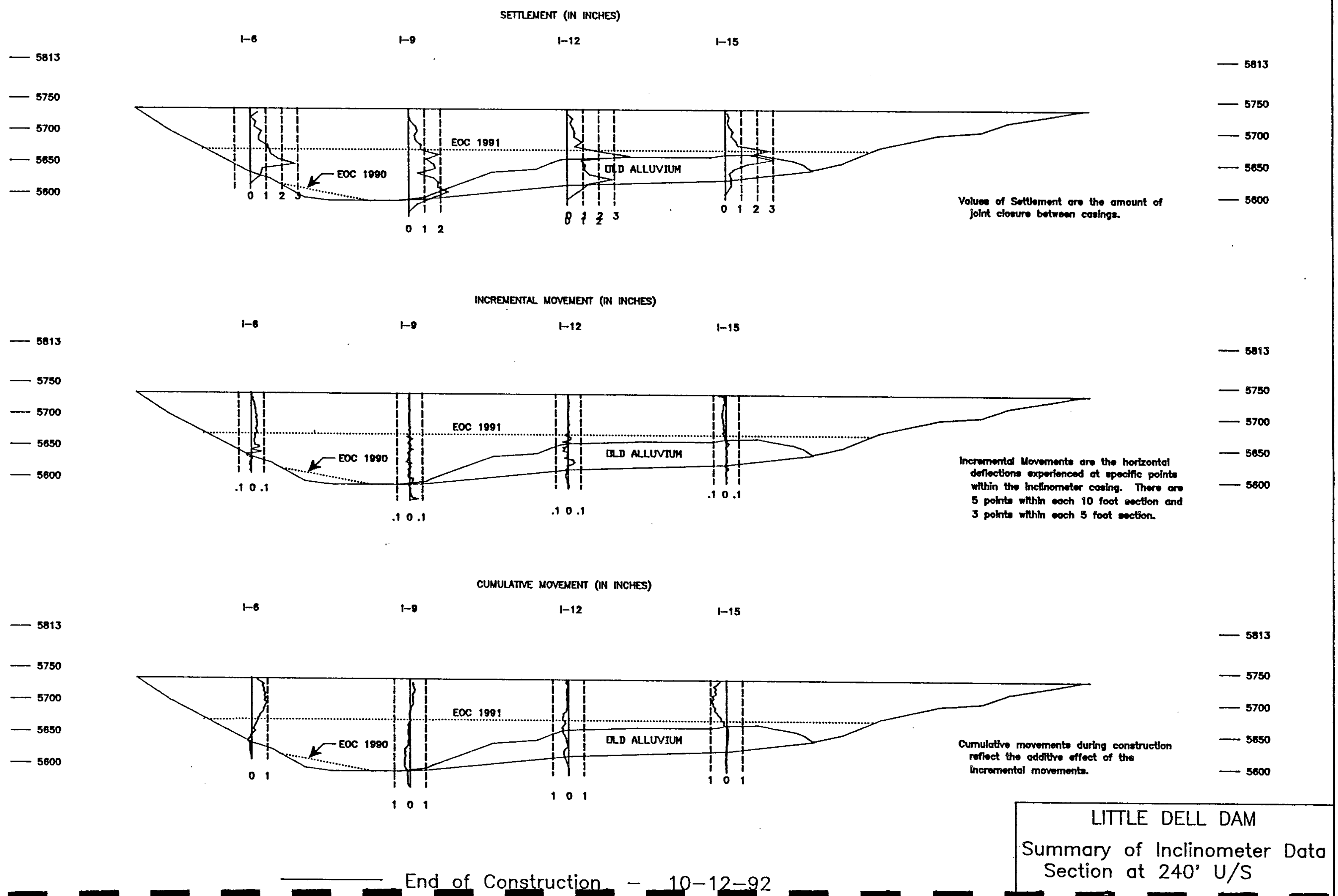


End of Construction – 10-12-92

LITTLE DELL DAM

Summary of Inclinometer Data
Section at Axis of Dam

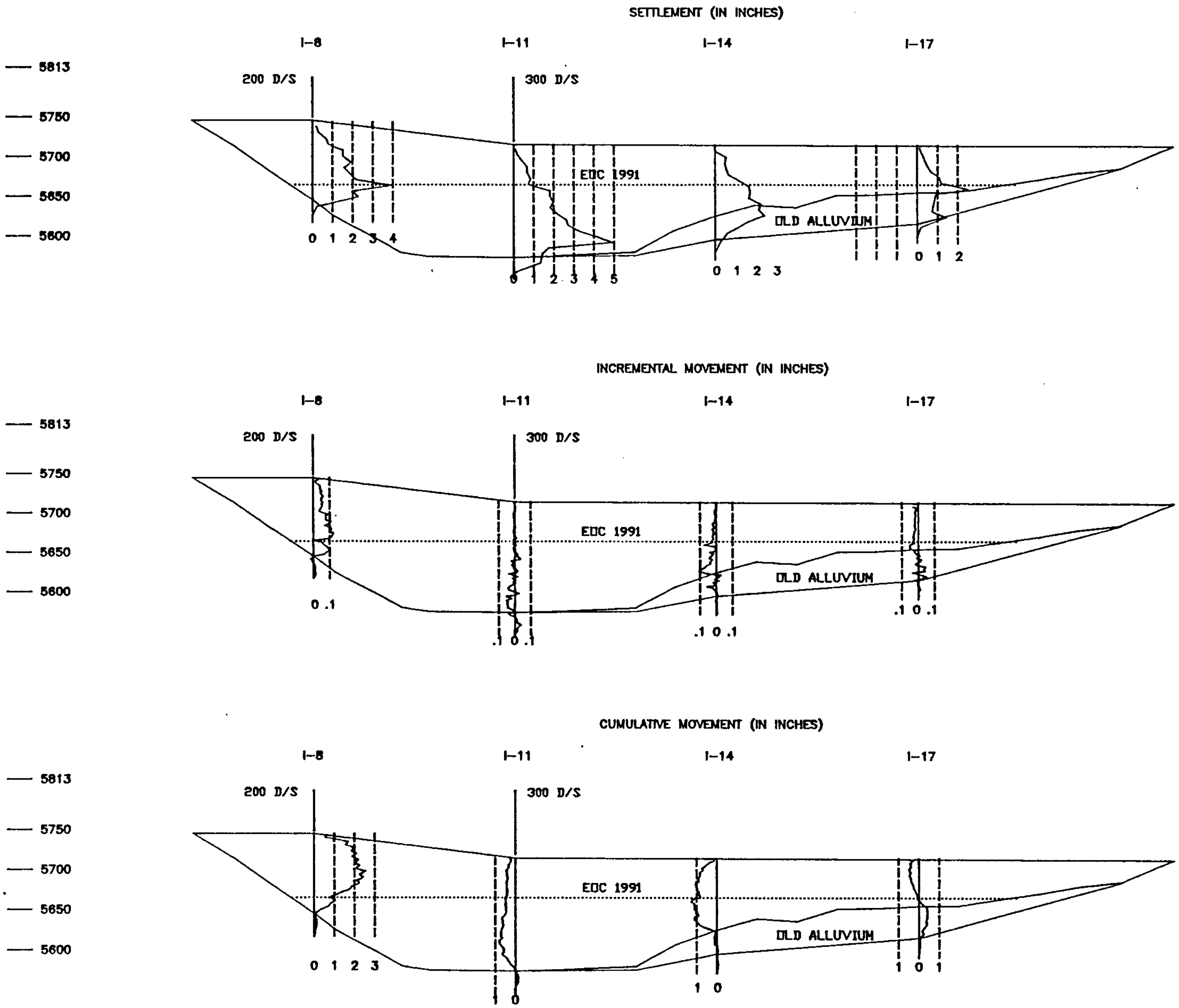
Plate



LITTLE DELL DAM

Summary of Inclinometer Data
Section at 240' U/S

Plate



Values of Settlement are the amount of joint closure between casings.

Incremental Movements are the horizontal deflections experienced at specific points within the inclinometer casing. There are 5 points within each 10 foot section and 3 points within each 5 foot section.

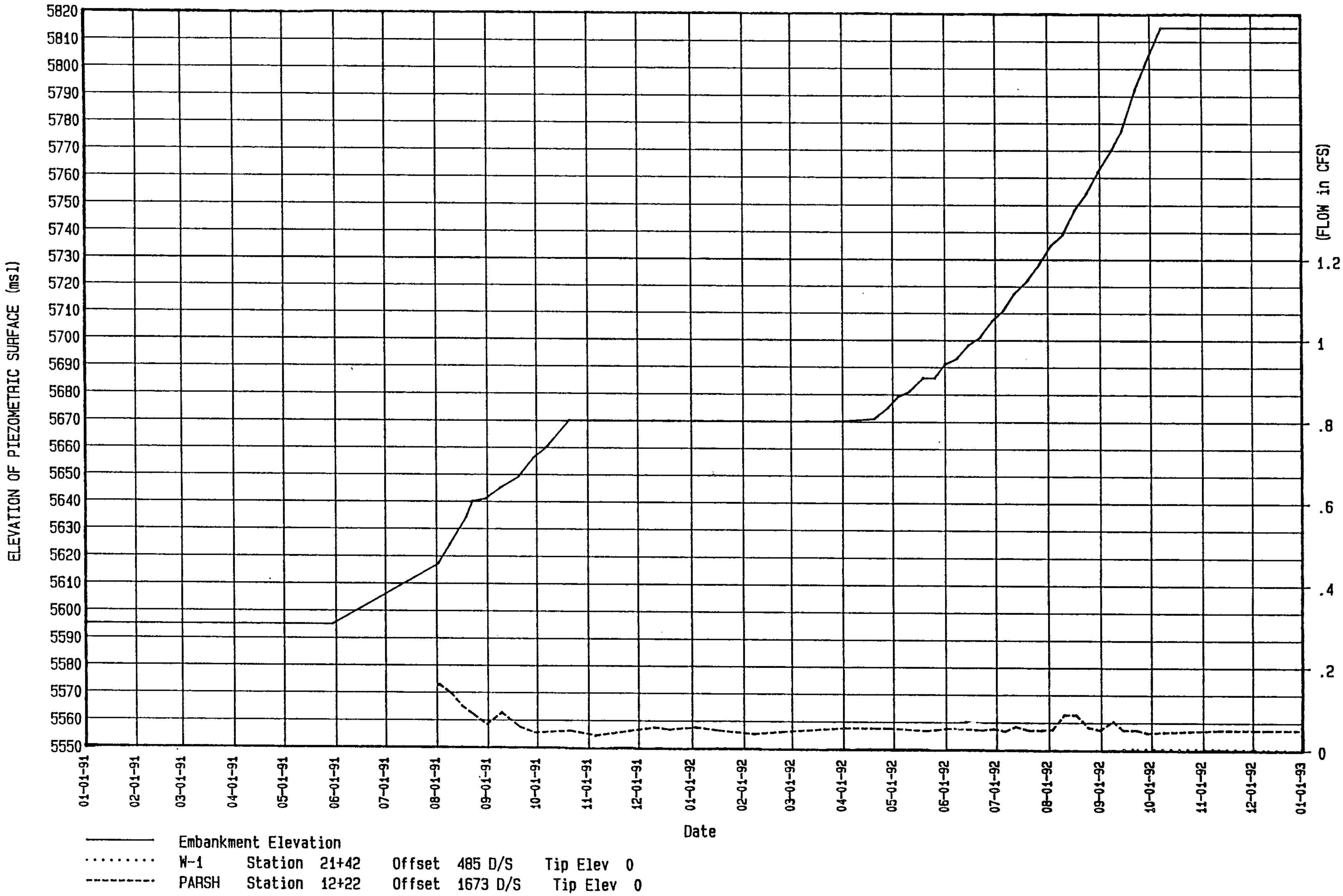
Cumulative movements during construction reflect the additive effect of the incremental movements.

End of Construction – 10–12–92

LITTLE DELL DAM

Summary of Inclinometer Data
Section at 300' D/S

Plate



LITTLE DELL DAM

: SEEPAGE FLOWS

PLATE

APPENDIX VI

REFERENCES AND RELATED PUBLICATIONS

APPENDIX VI

1.0 RELATED PUBLICATIONS

Design Memorandum No. 10, Little Dell Lake, Salt Lake City Streams, Utah, Embankment and Spillway, U., S. Army Corps of Engineers, Sacramento District, September 1987, Revised June 1988.

Design Memorandum No. 11, Little Dell Lake, Salt Lake City Streams, Utah, Outlet Works, U. S. Army Corps of Engineers, Sacramento District, September 1987, Revised May 1989.

Invitation for Bids, Dam and Appurtenances, Little Dell Lake, Salt Lake City Streams, Utah, Volume I - Bid Documents and Divisions 1 thru 13, Volume II - Divisions 14 through 16, Drawings, IFB No. DACW05-89-B-0012, Specification No. 8426, Drawing File No. JO-3-25-38. U. S. Army Corps of Engineers, Sacramento District.

End of Construction Report on Project Instrumentation, Little Dell Lake, Salt Lake City Streams, Utah, U. S. Army Corps of Engineers, Sacramento District, 1994.

Foundation Report, Little Dell Lake, Salt Lake City Streams, Utah, U. S. Army Corps of Engineers, Sacramento District, 1994.

Little Dell Dam and Lake, Dell Creek (Salt Lake City Streams) Utah, Emergency Action Plan, U. S. Army Corps of Engineers, Sacramento District, Sacramento, California, March, 1993. Prepared jointly with Sponsors.

Little Dell Dam and Lake, Dell Creek (Salt Lake City Streams) Utah, Water Control Manual, U. S. Army Corps of Engineers, Sacramento District, Sacramento, California, April, 1993.

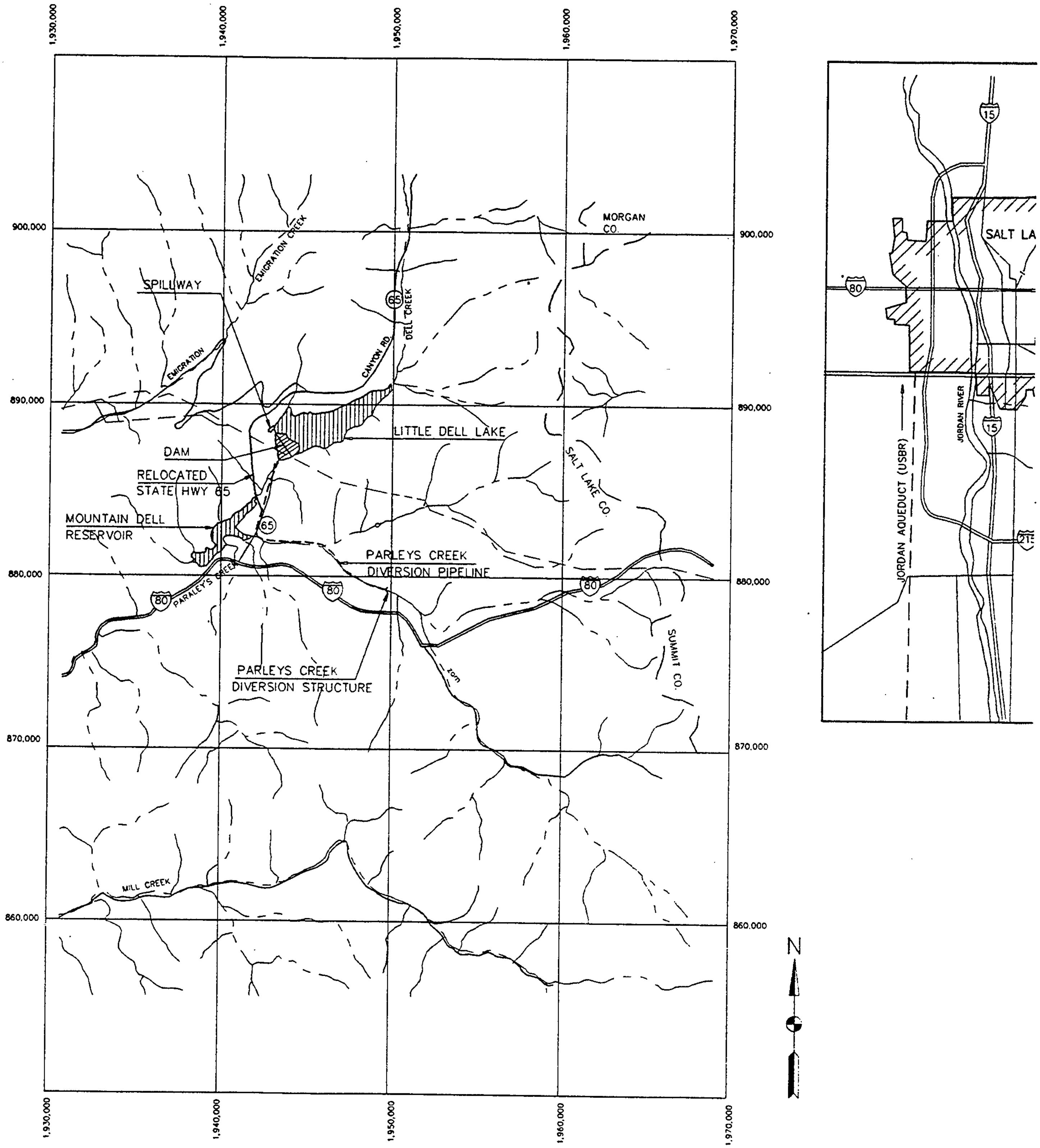
Little Dell Dam and Lake, Dell Creek (Salt Lake City Streams) Utah, Monitoring of Initial Lake Filling (Initial Lake Filling Plan), U. S. Army Corps of Engineers, Sacramento District, Sacramento, California, March, 1993.

Little Dell Dam and Lake, Dell Creek (Salt Lake City Streams) Utah, Operation and Maintenance Manual, U. S. Army Corps of Engineers, Sacramento District, Sacramento, California, April, 1993.

Little Dell Dam and Lake, Dell Creek, Utah, Dam, Spillway and Outlet Works, Periodic Inspection and Continuing Evaluation Report, Report 1, U. S. Army Corps of Engineers, Sacramento District, Sacramento, California, October 1992.

Test Fill Report

Bedrock Faults by Stratigraphic Correlation within the Reservoir Borrow Area of Little Dell Dam, Utah, Prepared by Thomas W. Fea, U. S. Army Corps of Engineers, Sacramento District, Sacramento, California, February 1993.

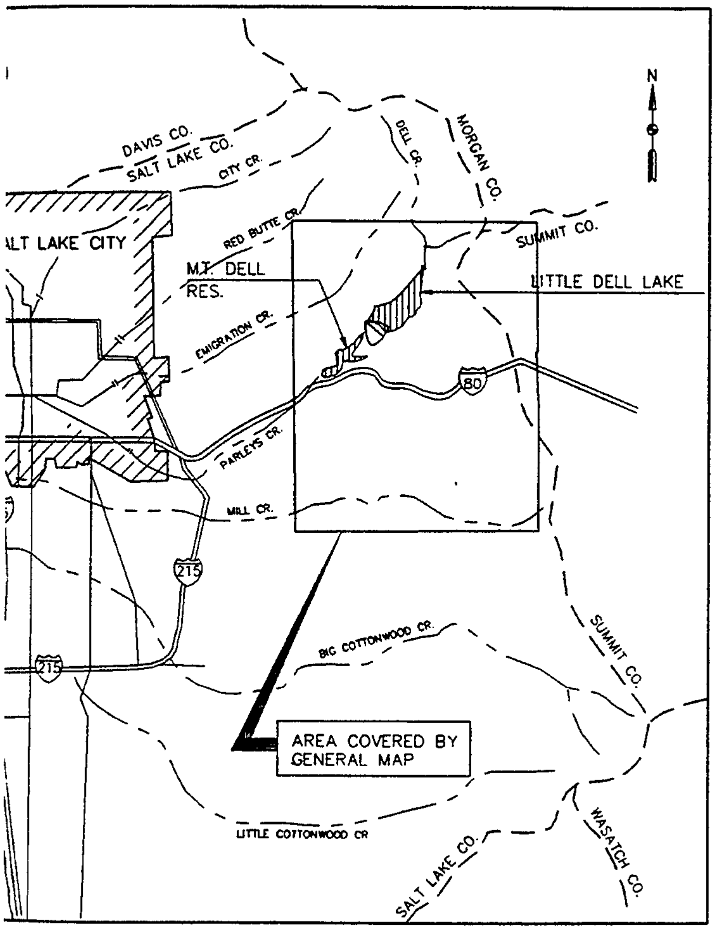


GENERAL MAP

SCALE: 1" = 8000 FT.

0 2 4 6 8 1000

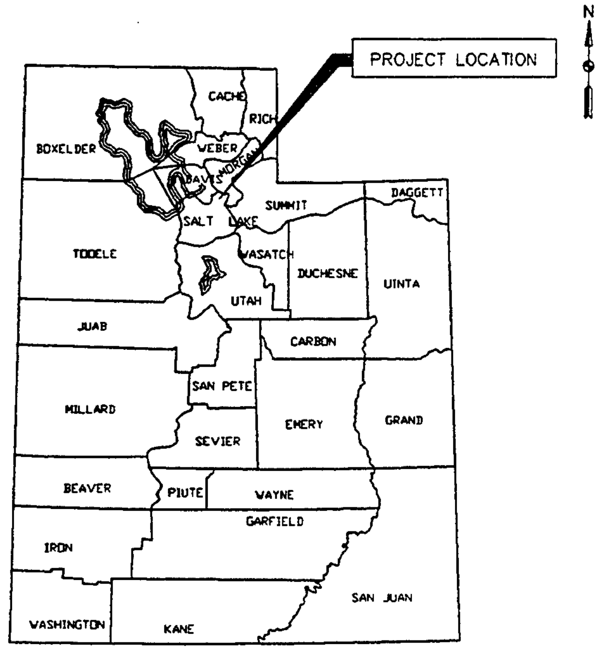
LITTLE DELL PROJECT: PL-01 24 MAY 94 NLB



LOCALITY MAP

SCALE IN MILES

3 0 3



VICINITY MAP

SCALE IN MILES

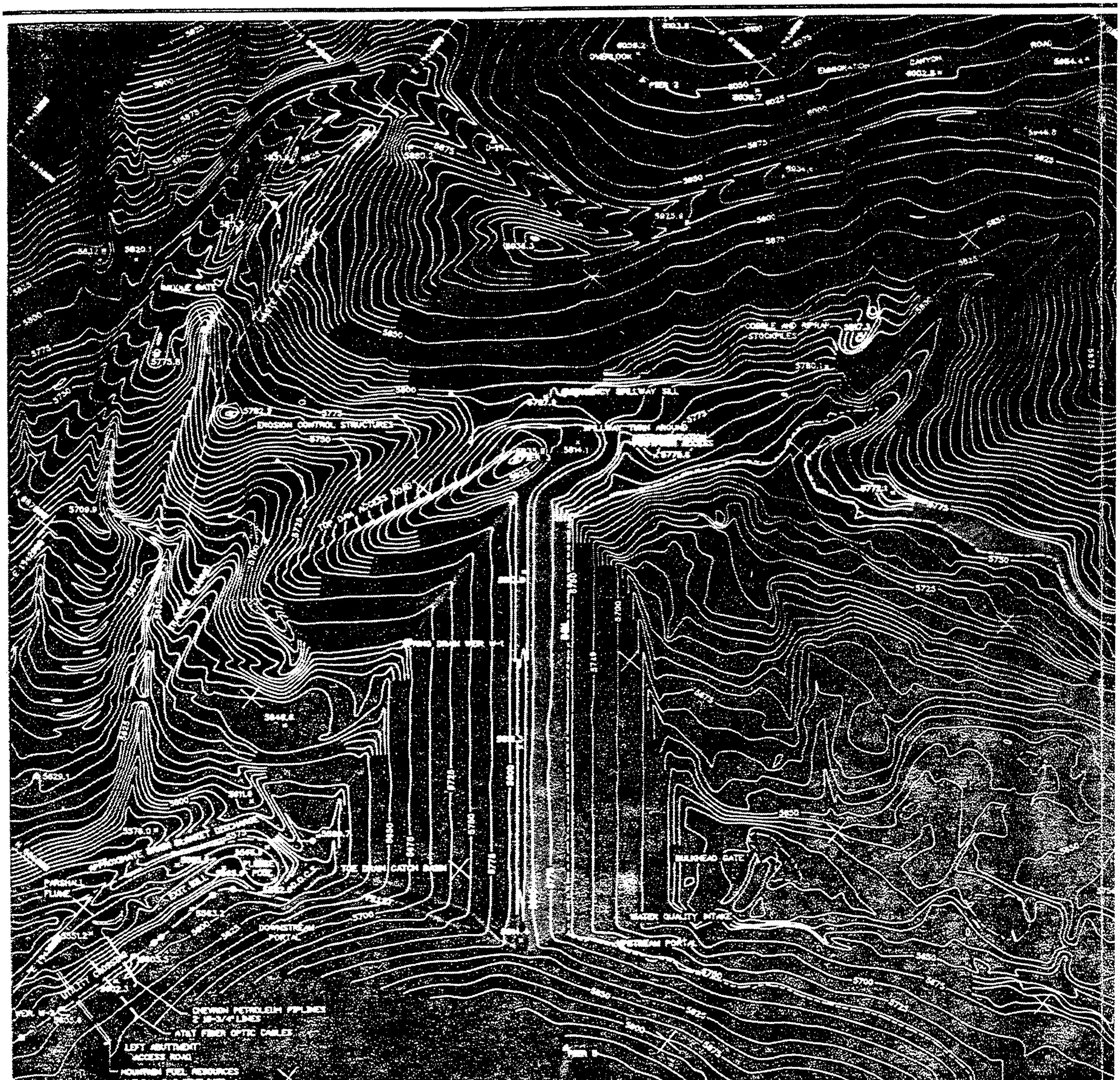
0 40 80
20 60 100

LITTLE DELL LAKE
SALT LAKE CITY STREAMS, UTAH

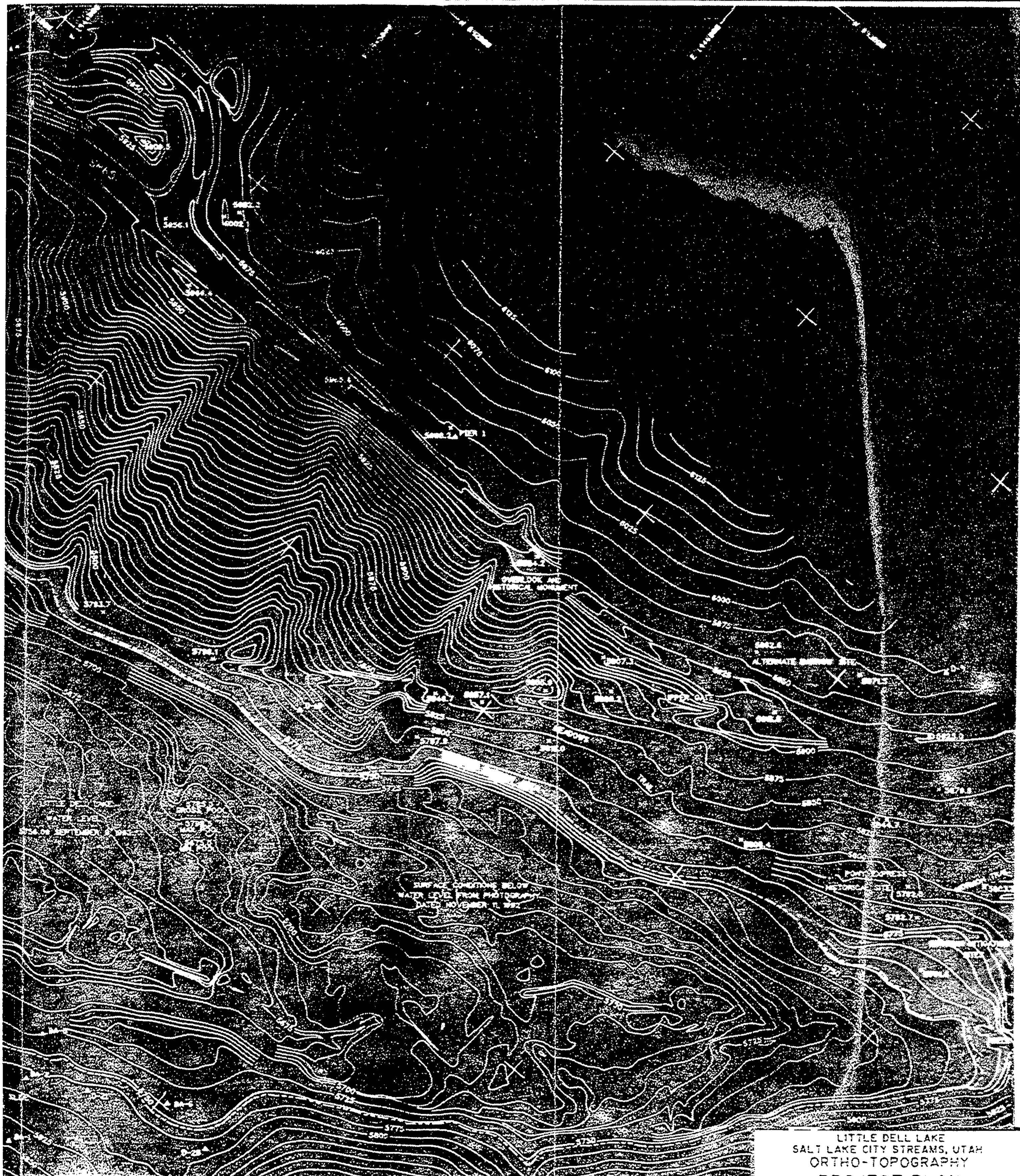
GENERAL LOCATION MAP

DEPARTMENT OF THE ARMY
SACRAMENTO DISTRICT, CORPS OF ENGINEERS
SACRAMENTO, CALIFORNIA

SUBMITTED:			APPROVED:
MICHAEL D. RAMSBOTHAM			RESIDENT ENGINEER
DR. BY GEB	CHECKED BY MDR		PLATE 1



OVERLOOK
EMMIGRATION CANYON ROAD
COBBLE AND RIPRAP STOCKPILES
EMERGENCY SPILLWAY SILL
EROSION CONTROL STRUCTURES
SPILLWAY TURN AROUND
TOE DAM ACCESS ROAD
BULKHEAD GATE
WATER QUALITY INTAKE
UPSTREAM PORTAL
DOWNSTREAM PORTAL
TOE DRAIN CATCH BASIN
PARSHALL FLUME
CHEVRON PETROLEUM PIPELINES
AT&T FIBER OPTIC CABLES
LEFT ABUTMENT
ACCESS ROAD
MOUNTAIN FUEL RESOURCES
NATURAL GAS PIPELINES
N
500



LITTLE DELL LAKE
SALT LAKE CITY STREAMS, UTAH
ORTHO-TOPOGRAPHY

PROJECT PLAN
(General Layout)

DEPARTMENT OF THE ARMY
SACRAMENTO DISTRICT, CORPS OF ENGINEERS
SACRAMENTO, CALIFORNIA

SUBMITTED: MICHAEL D. RAMSBOTHAM
APPROVED:

DRAWN BY: NLS | CHECKED BY: MDR

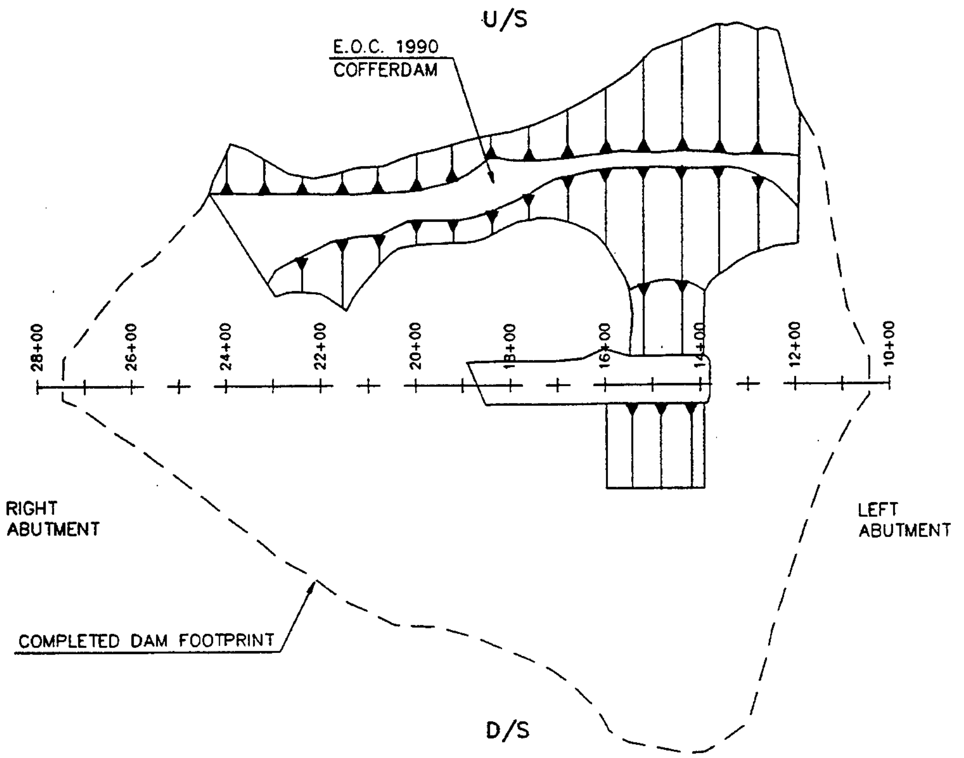
PLATE 2

250 0 500 1000

SCALE 1"=500'

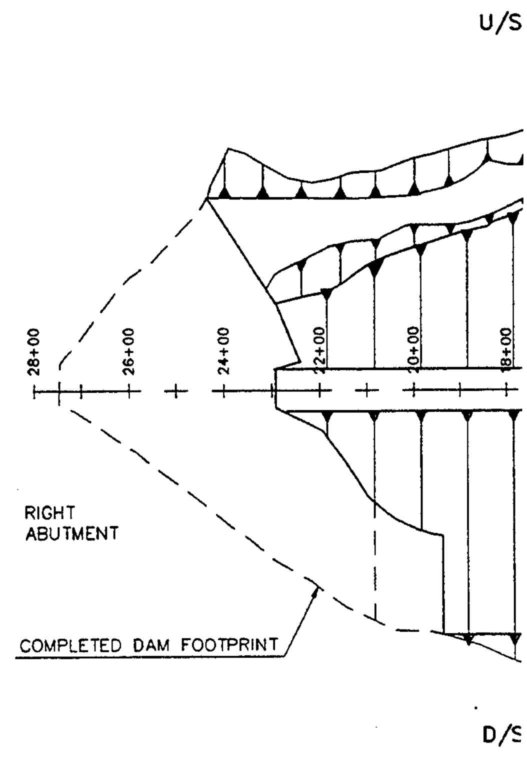
CONTOUR INTERVAL 5'

DATE OF PHOTOGRAPHY SEPT. 9, 1993



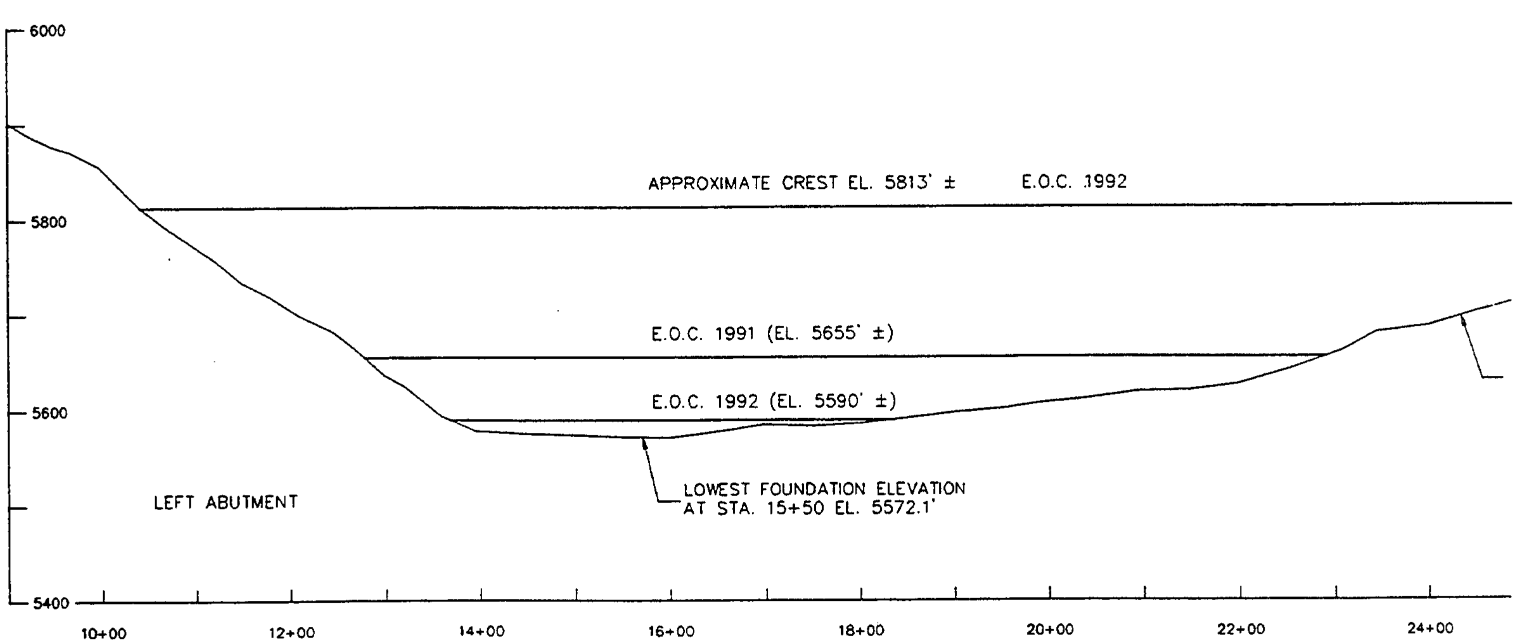
PLAN – E.O.C. 1990

SCALE: 1" = 400'



PLAN – E.O

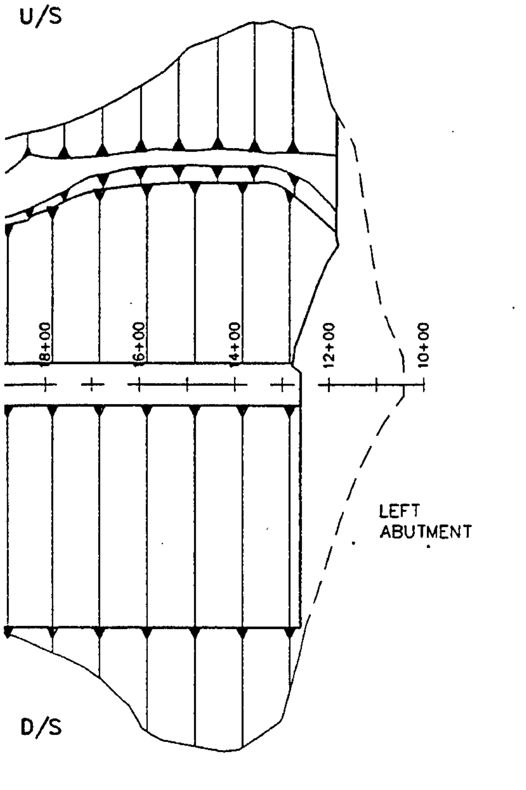
SCALE: 1"



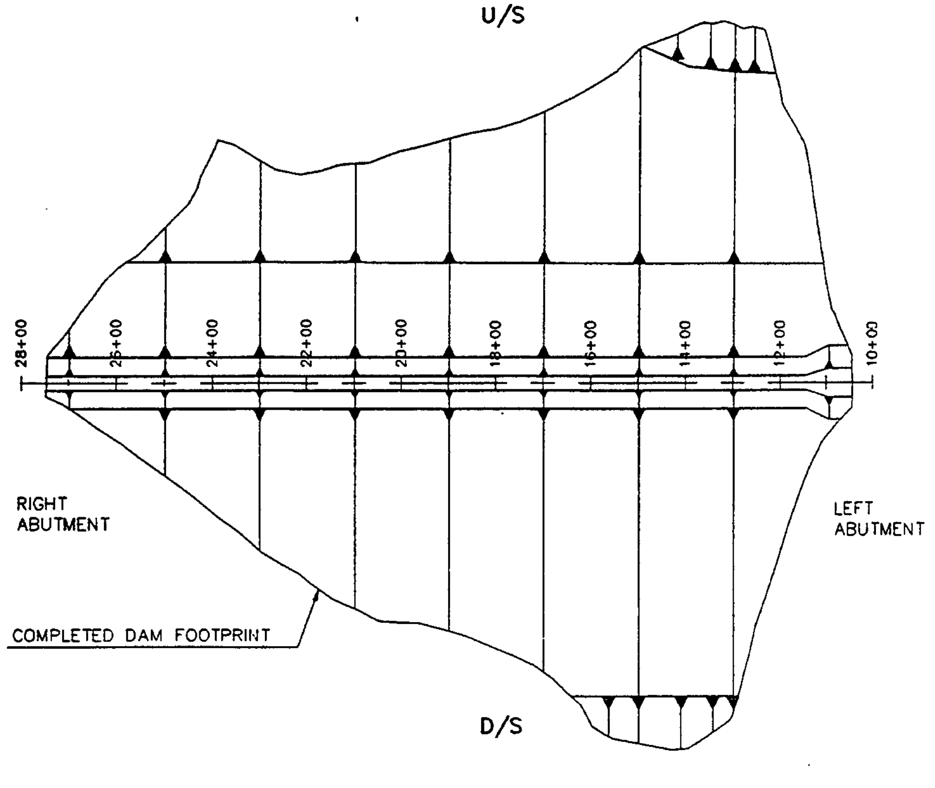
PROFILE ALONG DAM AXIS AT END OF CONSTRUCTION, 1990, 1991,

SCALE: 1" = 200'

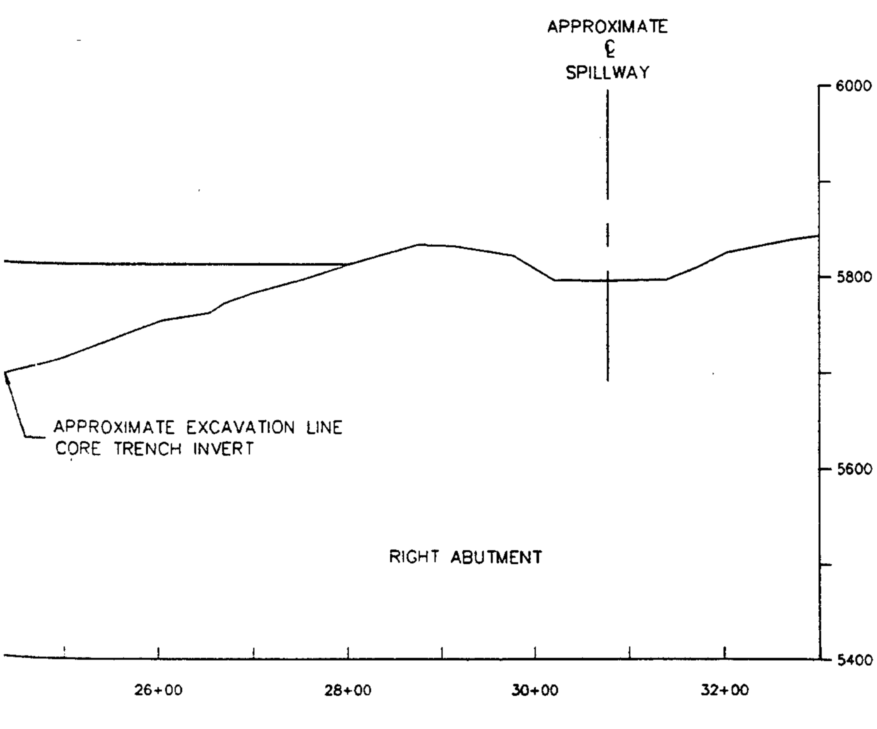
LITTLE DELL PROJECT: PL-03 24 MAY 94 NLB



E.O.C. 1991
:: 1" = 400'



PLAN – E.O.C. 1992
SCALE: 1" = 400'

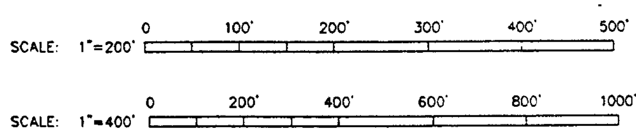


991, AND 1992

LEGEND

E.O.C. – END OF CONSTRUCTION

GRAPHIC SCALES



LITTLE DELL LAKE
SALT LAKE CITY STREAMS, UTAH

EMBANKMENT STAGES
PLANS AND PROFILES

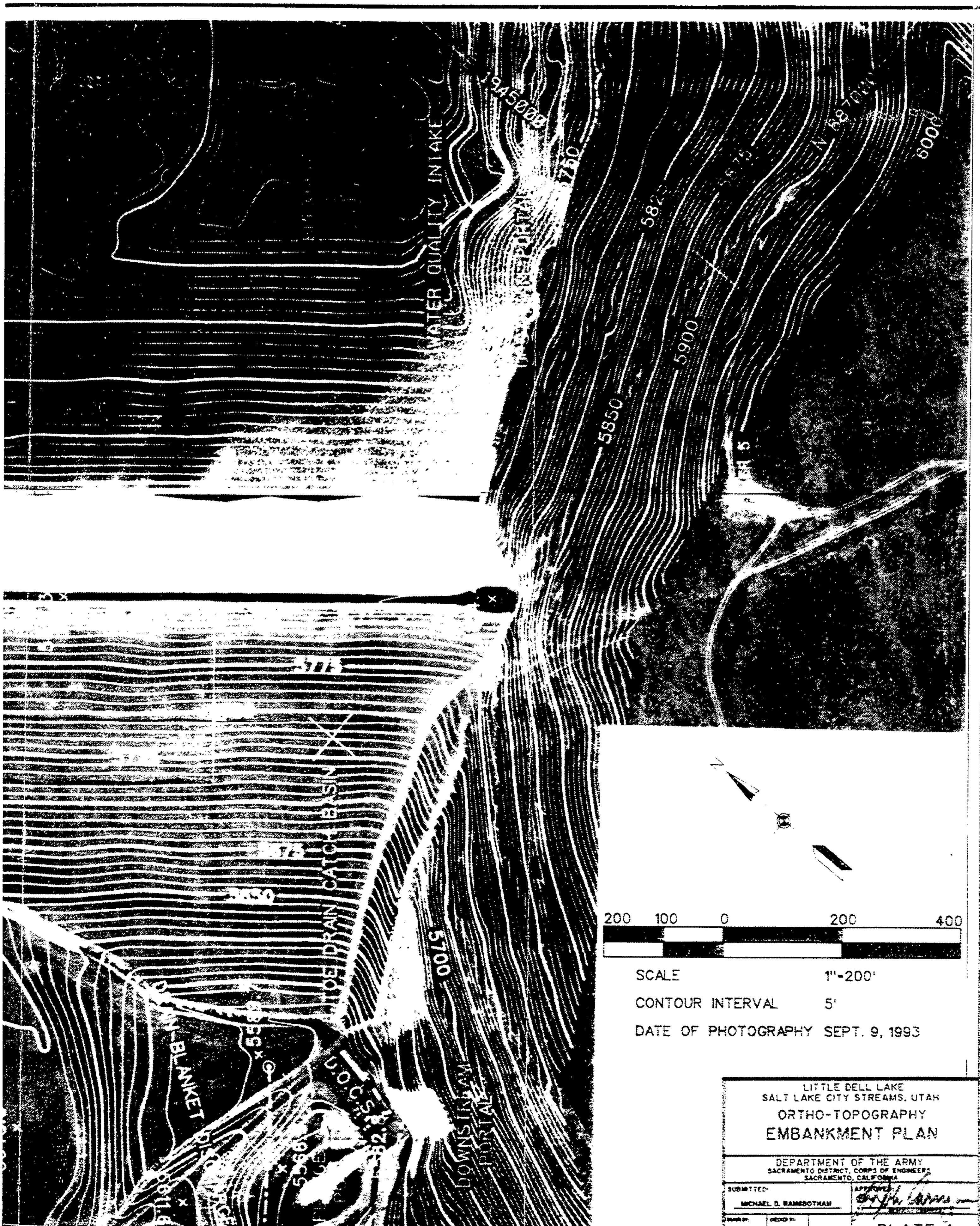
DEPARTMENT OF THE ARMY
SACRAMENTO DISTRICT, CORPS OF ENGINEERS
SACRAMENTO, CALIFORNIA

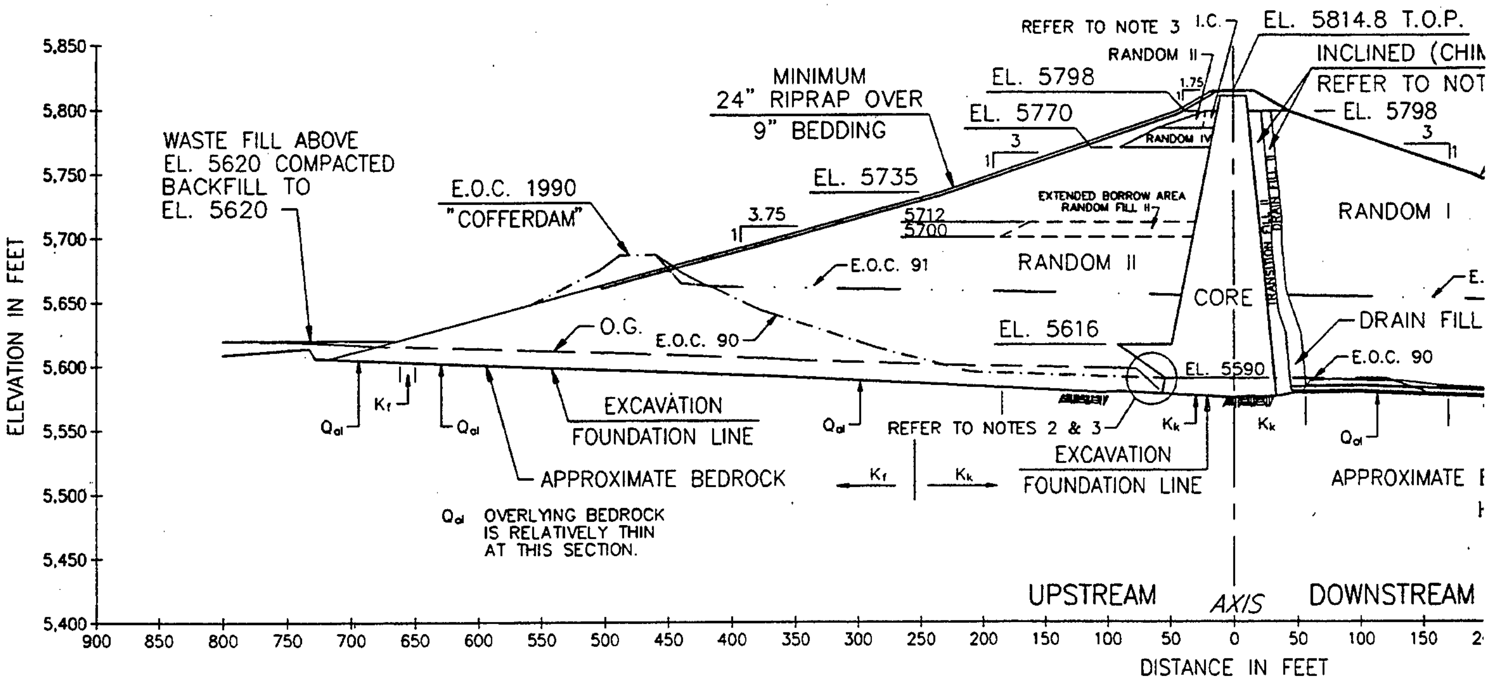
SUBMITTED: MICHAEL D. RAMSBOTHAM			APPROVED: RESIDENT ENGINEER
DR. BY GEB	CHECKED BY MDR	CHECKED BY CEC	PLATE 3

1=400

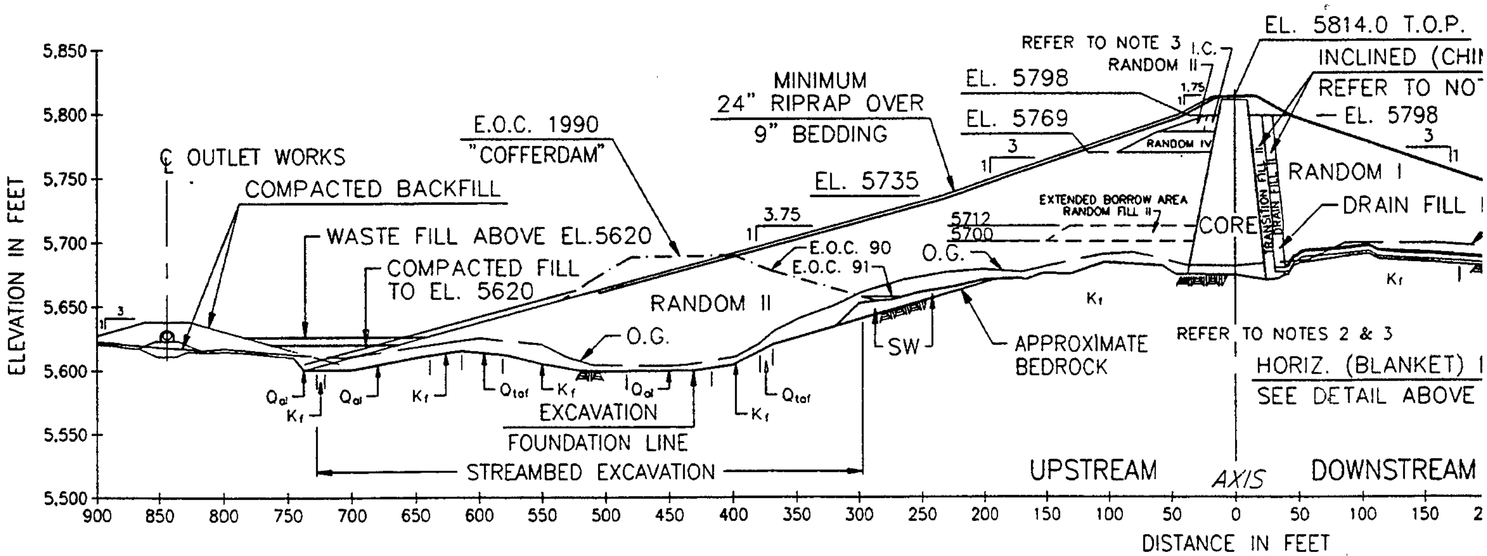
2


COBBLE AND RIPRAP
STOCKPILES
5700
5725
5750
5814.1
TOP DAM ACCESS ROAD
5850
5800
WASTE FILL + DRAINAGE
TRAINING CHANNEL
5725
5700
5848.6

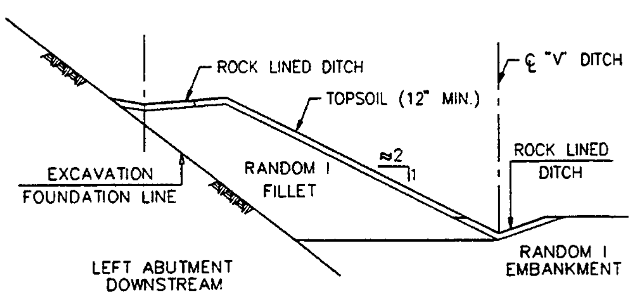

WATER QUALITY INTAKE
5850
5900
6000
5700
DRAIN CATCH BASIN
DOWNSTREAM PORTAL
200 100 0 200 400
SCALE 1"=200'
CONTOUR INTERVAL 5'
DATE OF PHOTOGRAPHY SEPT. 9, 1993
LITTLE DELL LAKE
SALT LAKE CITY STREAMS, UTAH
ORTHO-TOPOGRAPHY
EMBANKMENT PLAN
DEPARTMENT OF THE ARMY
SACRAMENTO DISTRICT, CORPS OF ENGINEERS
SACRAMENTO, CALIFORNIA
SUBMITTED:
MICHAEL D. RAMSBOTHAM
APPROVED:
NLS
MDR
PLATE 4



STA. 14+50

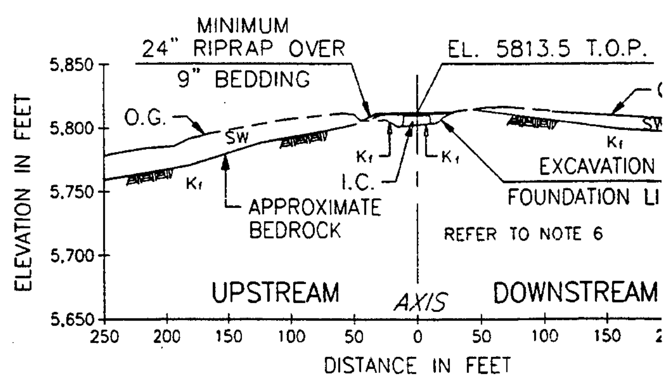


STA. 12+50



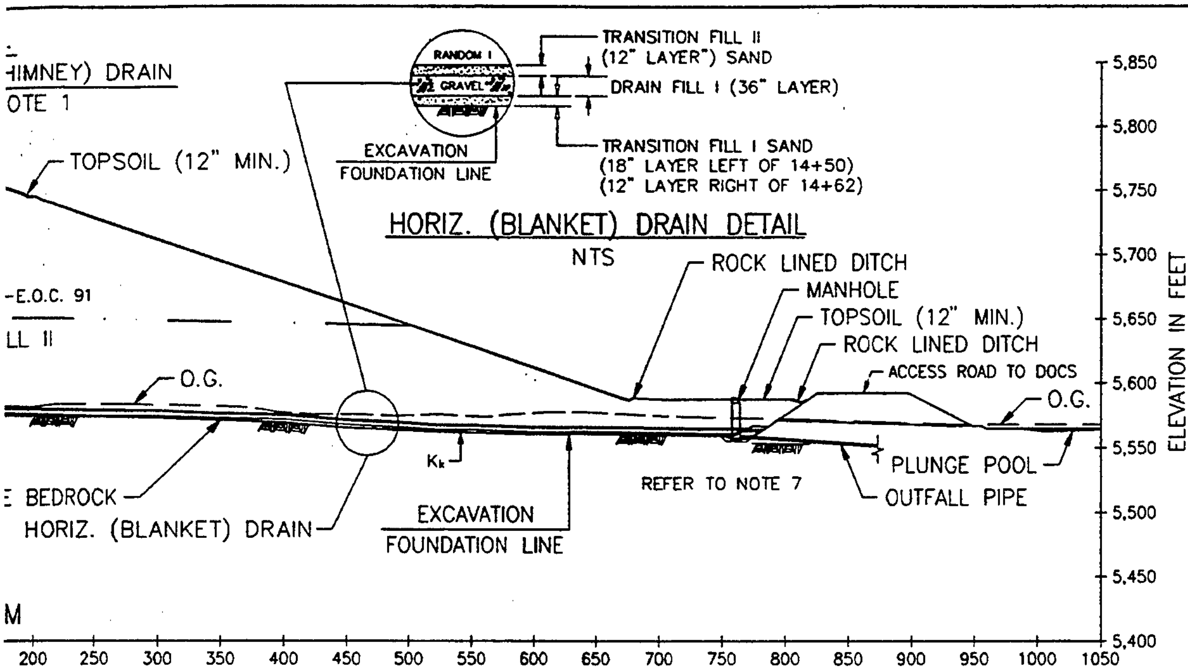
LEFT ABUTMENT SECTION DETAIL

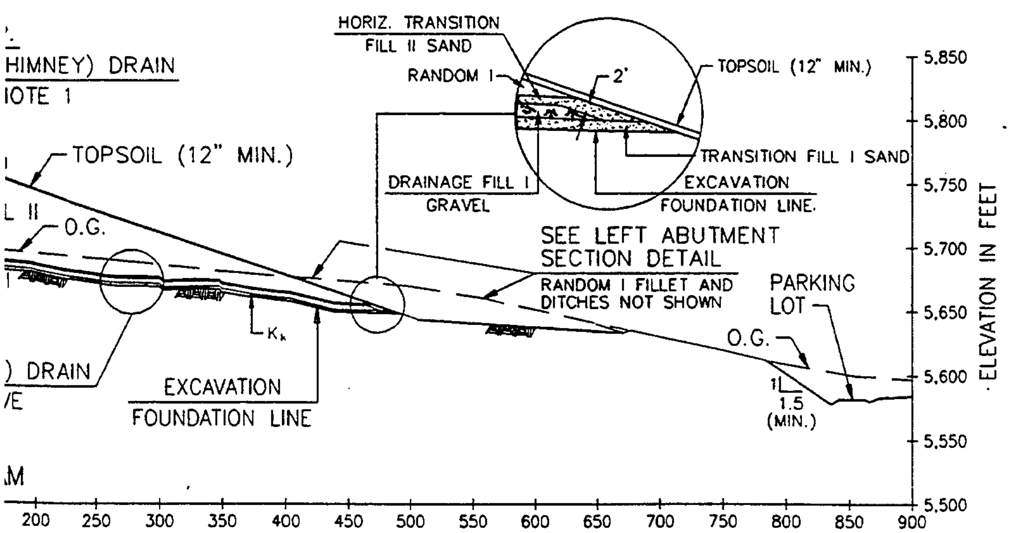
LEFT ABUTMENT DOWNSTREAM
(TYPICAL BETWEEN STA. 13+50± TO STA. 16+25±)



STA. 10+50

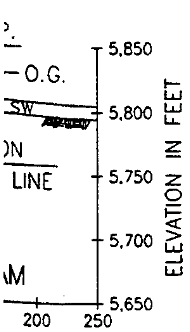
LITTLE DELL PROJECT: PL-05 24 MAY 94 NLB





LEGEND:

K_f	FRONTIER FORMATION
K_k	KELVIN FORMATION
Q_{al}	YOUNGER ALLUVIUM
Q_{to}	OLDER ALLUVIUM
Q_{tof}	FINE GRAINED, OLDER ALLUVIUM
Q_{tou}	UPPER GRAVEL, OLDER ALLUVIUM
Q_{tob}	BASAL GRAVEL, OLDER ALLUVIUM
O.G.	ORIGINAL GROUND LINE
OLS	OLD LANDSLIDE
SW	SLOPEWASH
T.O.P	TOP OF PAVEMENT
E.O.C.	END OF CONSTRUCTION
— · — · —	END OF CONSTRUCTION 1990 (E.O.C. 90)
— ·· — ·· —	END OF CONSTRUCTION 1991 (E.O.C. 91)
(bedrock symbol)	APPROXIMATE BEDROCK LINE



NOTES:

1. DRAINAGE FILL II AND TRANSITION FILL II ZONES ARE DRAWN AS 8' WIDTHS. ACTUAL ZONE WIDTHS STARTED AT 12' AND WERE REDUCED TO ABOUT 10' (±1'). DRAINAGE FILL II CAPPED WITH TRANSITION II SAND.
2. AT THE ABUTMENTS THE IMPERVIOUS CORE ZONE WAS WIDENED TO SIMPLIFY PLACEMENT. THE IMPERVIOUS CORE ZONE MAY BE AS MUCH AS 15 FT. TO 20 FT. WIDER AT THE ABUTMENT THAN SHOWN.
3. IMPERVIOUS CORE TO RANDOM II ZONE LINE LOCATION IS VERY APPROXIMATE AT THIS SECTION/ELEVATION. IMPERVIOUS CORE IS GENERALLY WIDER THAN SHOWN.
4. GEOLOGY ANNOTATIONS INDICATE ONLY WHAT WAS EXPOSED AT THE FOUNDATION ELEVATION.
5. DRAINAGE BLANKET LAYER DIMENSIONS ARE MINIMUM DESIGN THICKNESSES PERPENDICULAR TO THE SLOPE. DRAINAGE FILL I LAYER WAS CAPPED WITH TRANSITION FILL II SAND AT THE ABUTMENTS, EL. 5780 FT.
6. HORIZONTAL (BLANKET) DRAIN TERMINATED AT EL. 5780, ABOUT STA. 10+80 TO STA. 10+90. DRAINAGE FILL I WAS CAPPED WITH TRANSITION FILL II.
7. THE MANHOLE IS AT STA. 14+49.0, 759.4 FEET DOWNSTREAM OF THE DAM AXIS. THERE ARE TWO LATERAL TOE DRAINS 12" DIA., SCHED. 80, SLOTTED PVC PIPE. THE LEFT LATERAL DRAIN INVERT IS AT EL. 5557.2 FT. THE OUTFALL IS AN 18" DIA., SCHED. 80 PVC PIPE WITH AN INVERT AT EL. 5558.2 FT. THE OUTFALL PIPE DISCHARGES ABOVE THE PARSHALL FLUME. THE LEFT LATERAL DRAIN TERMINATES AT STA. 13+23.4, OFFSET -674.5 FT. ANE EL. 5569.2 FT. THE RIGHT LATERAL DRAIN TERMINATES AT STA. 15+31.2, OFFSET -710.0 FT. AND EL. 5568. FT.

LITTLE DELL LAKE
SALT LAKE CITY STREAMS, UTAH

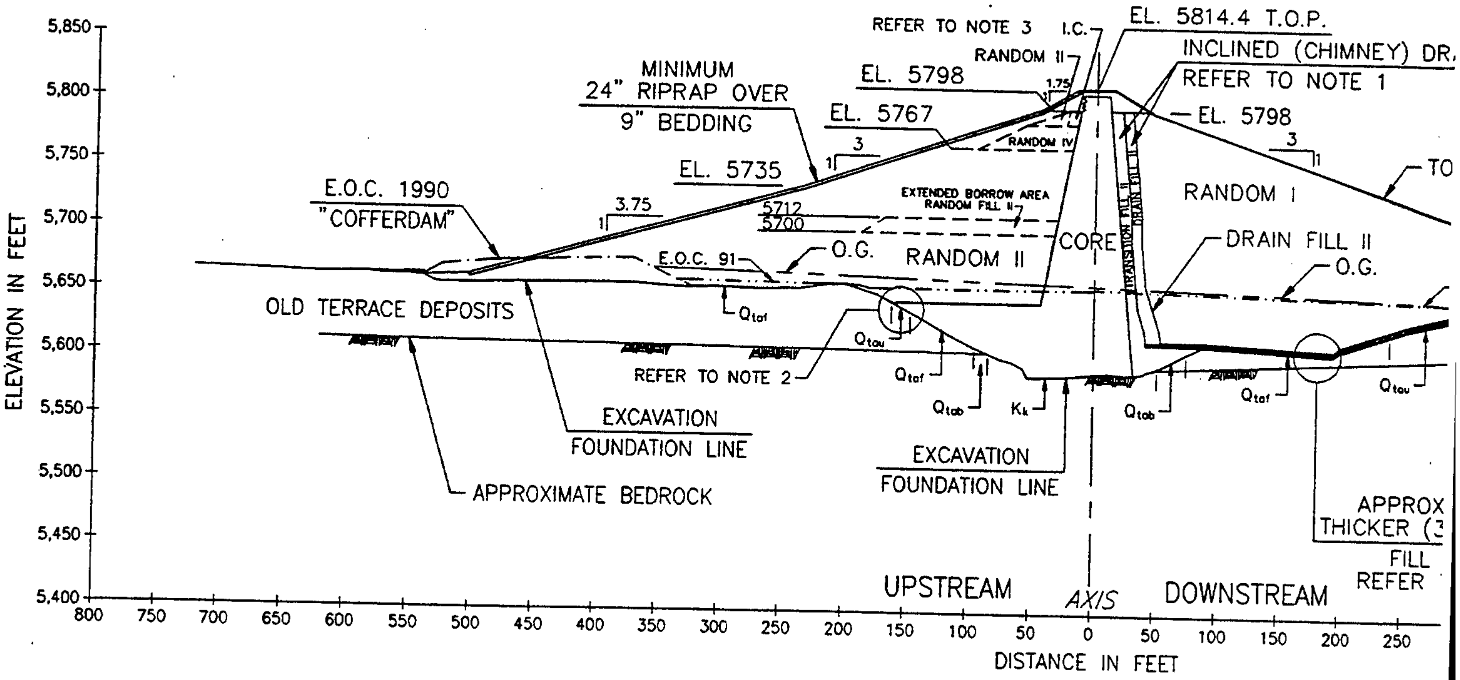
EMBANKMENT SECTIONS (AS-BUILT)
STATION 10+50, 12+50, 14+50

DEPARTMENT OF THE ARMY
SACRAMENTO DISTRICT, CORPS OF ENGINEERS
SACRAMENTO, CALIFORNIA

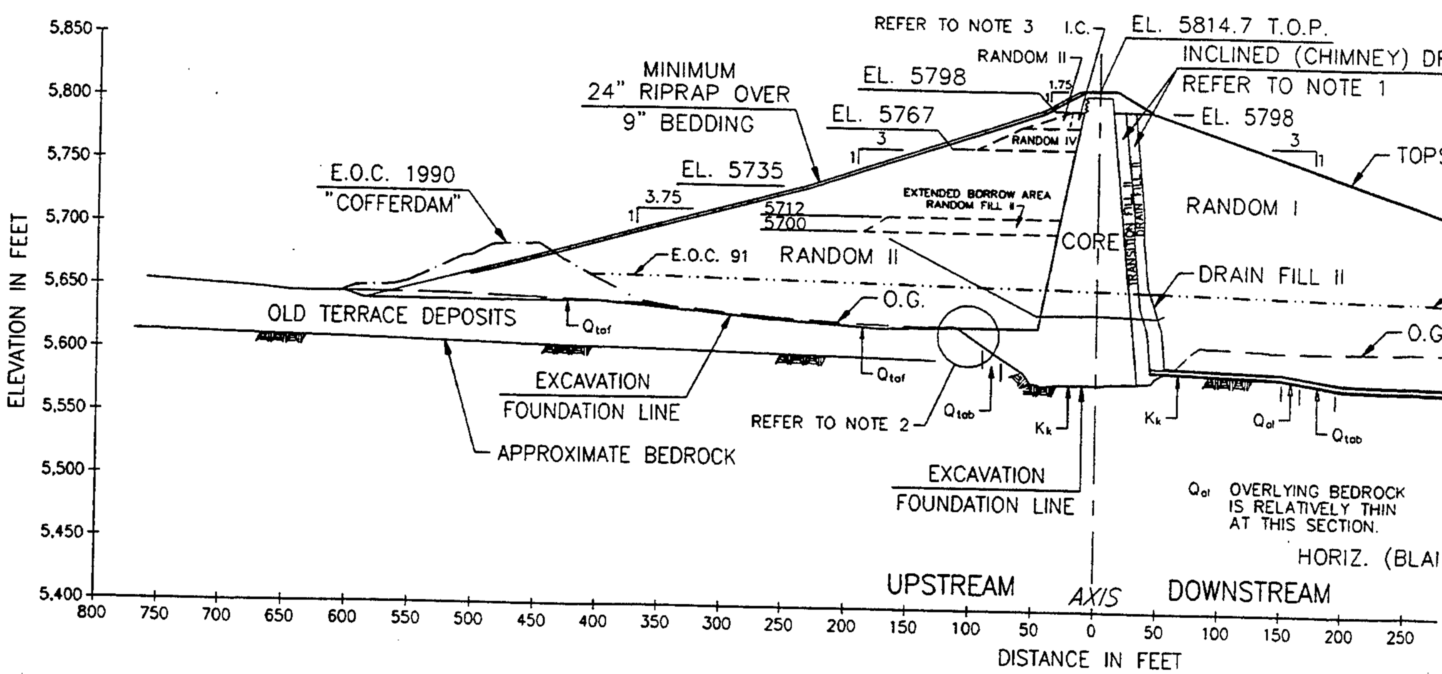
SUBMITTED:		APPROVED:
MICHAEL D. RAMSBOTHAM		RESIDENT ENGINEER
DR. BY GEB	CHECKED BY MDR	PLATE 5

1=150

2

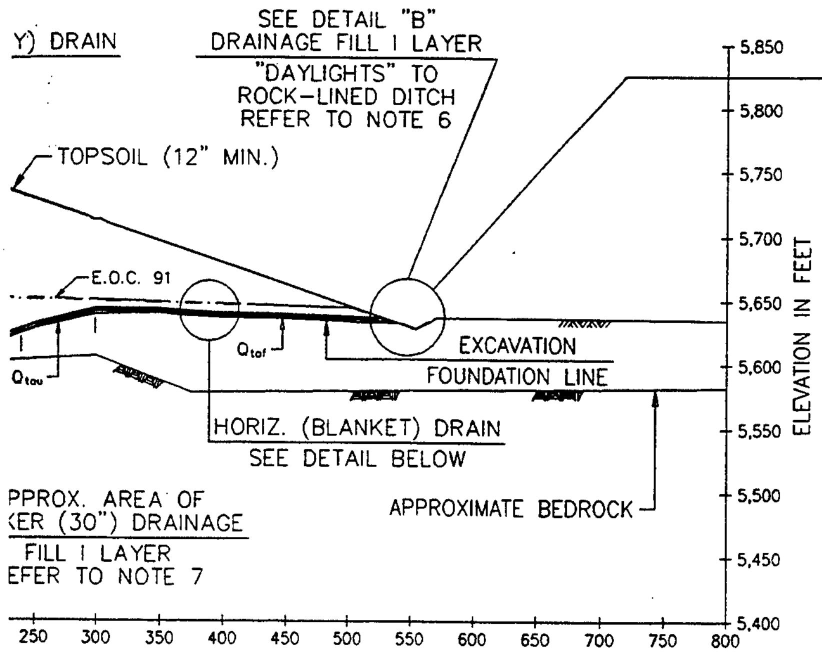


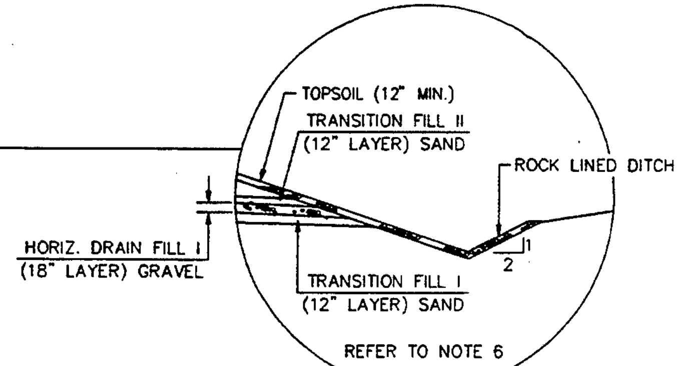
STA. 18+50



STA. 16+50

LITTLE DELL PROJECT: PL-06 24 MAY 94 NLB



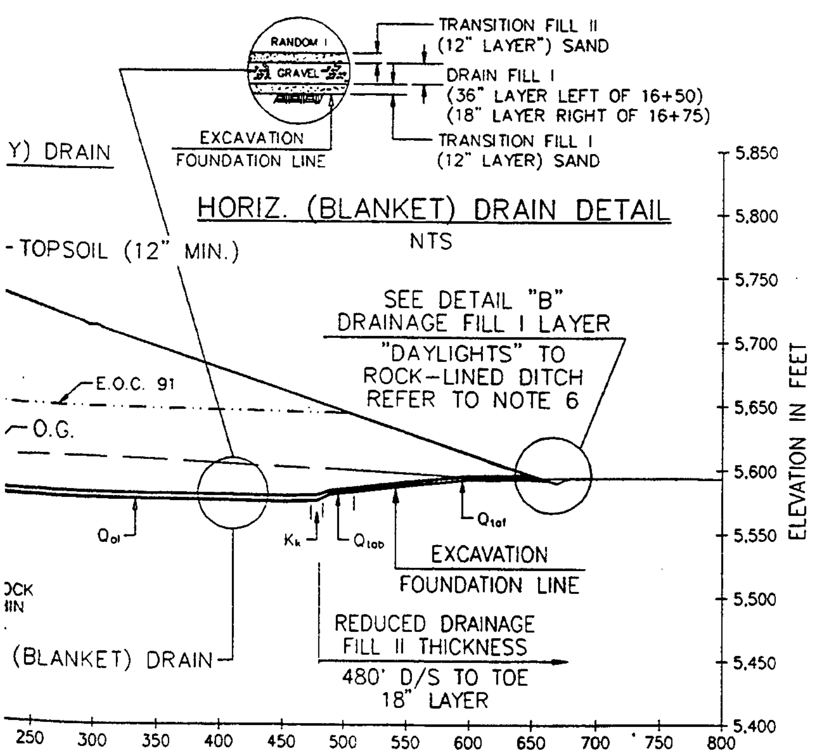


DETAIL "B"

NTS

LEGEND:

K_f	FRONTIER FORMATION
K_k	KELVIN FORMATION
Q_{al}	YOUNGER ALLUVIUM
Q_{to}	OLDER ALLUVIUM
Q_{tof}	FINE GRAINED, OLDER ALLUVIUM
Q_{tou}	UPPER GRAVEL, OLDER ALLUVIUM
Q_{tob}	BASAL GRAVEL, OLDER ALLUVIUM
O.G.	ORIGINAL GROUND LINE
OLS	OLD LANDSLIDE
SW	SLOPEWASH
T.O.P.	TOP OF PAVEMENT
E.O.C.	END OF CONSTRUCTION
—·—·—	END OF CONSTRUCTION 1990 (E.O.C. 90)
—··—··—	END OF CONSTRUCTION 1991 (E.O.C. 91)
	APPROXIMATE BEDROCK LINE



NOTES:

1. DRAINAGE FILL II AND TRANSITION FILL II ZONES ARE DRAWN AS 8' WIDTHS. ACTUAL ZONE WIDTHS ARE ABOUT 10' (±1'). DRAINAGE FILL II CAPPED WITH TRANSITION II SAND.
2. AT THE ABUTMENTS THE IMPERVIOUS CORE ZONE WAS WIDENED TO SIMPLIFY PLACEMENT. THE IMPERVIOUS CORE ZONE MAY BE AS MUCH AS 15 FT. TO 20 FT. WIDER AT THE ABUTMENT THAN SHOWN.
3. IMPERVIOUS CORE TO RANDOM II ZONE LINE LOCATION IS VERY APPROXIMATE AT THIS SECTION/ELEVATION. IMPERVIOUS CORE IS GENERALLY WIDER THAN SHOWN.
4. GEOLOGY ANNOTATIONS INDICATE ONLY WHAT WAS EXPOSED AT THE FOUNDATION ELEVATION.
5. DRAINAGE BLANKET LAYER DIMENSIONS ARE MINIMUM DESIGN THICKNESSES PERPENDICULAR TO THE SLOPE. DRAINAGE FILL I LAYER WAS CAPPED WITH TRANSITION FILL II SAND AT THE ABUTMENTS, EL. 5780 FT.
6. DRAINAGE FILL I LAYER DAYLIGHTS TO THE ROCK LINED DITCH BETWEEN APPROXIMATELY STA. 16+35 TO STA. 24+00.
7. AREA OF THICKENED DRAINAGE FILL I LAYER EXTENDS FROM APPROXIMATELY STA. 16+75 TO STA. 20+75 IN THIS LOW AREA.

LITTLE DELL LAKE
SALT LAKE CITY STREAMS, UTAH

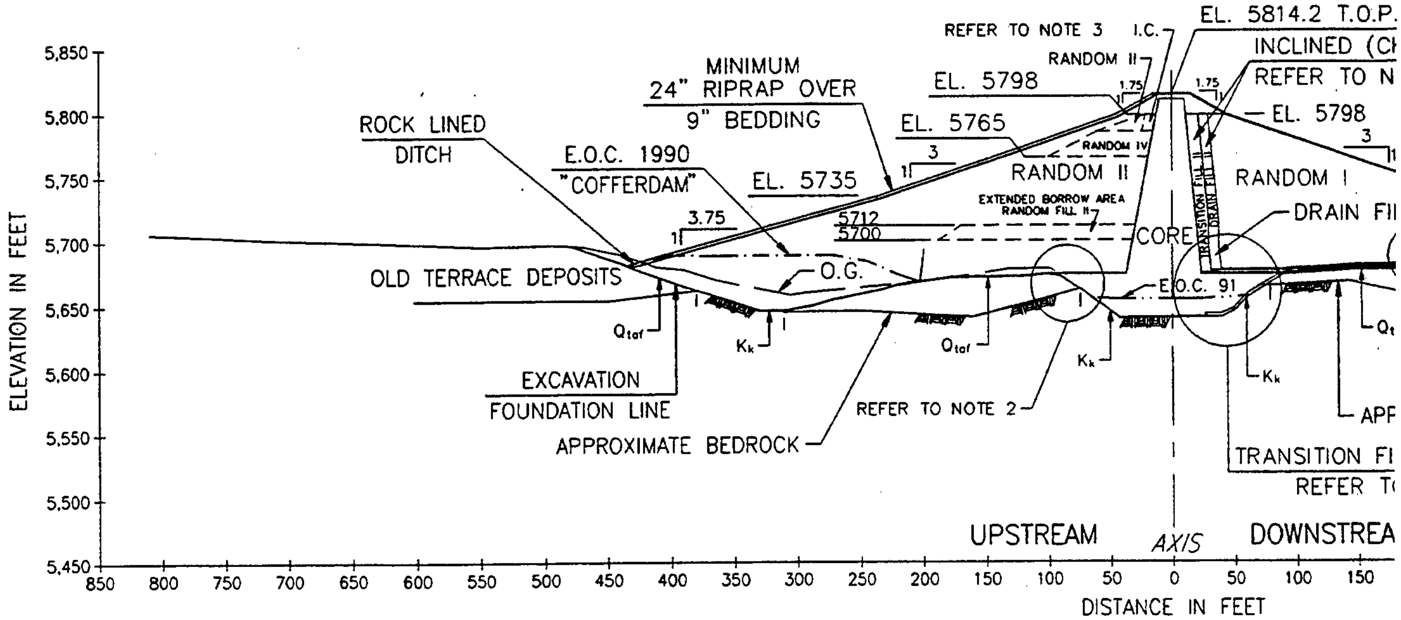
EMBANKMENT SECTIONS (AS-BUILT)
STA. 16+50 AND STA. 18+50

DEPARTMENT OF THE ARMY
SACRAMENTO DISTRICT, CORPS OF ENGINEERS
SACRAMENTO, CALIFORNIA

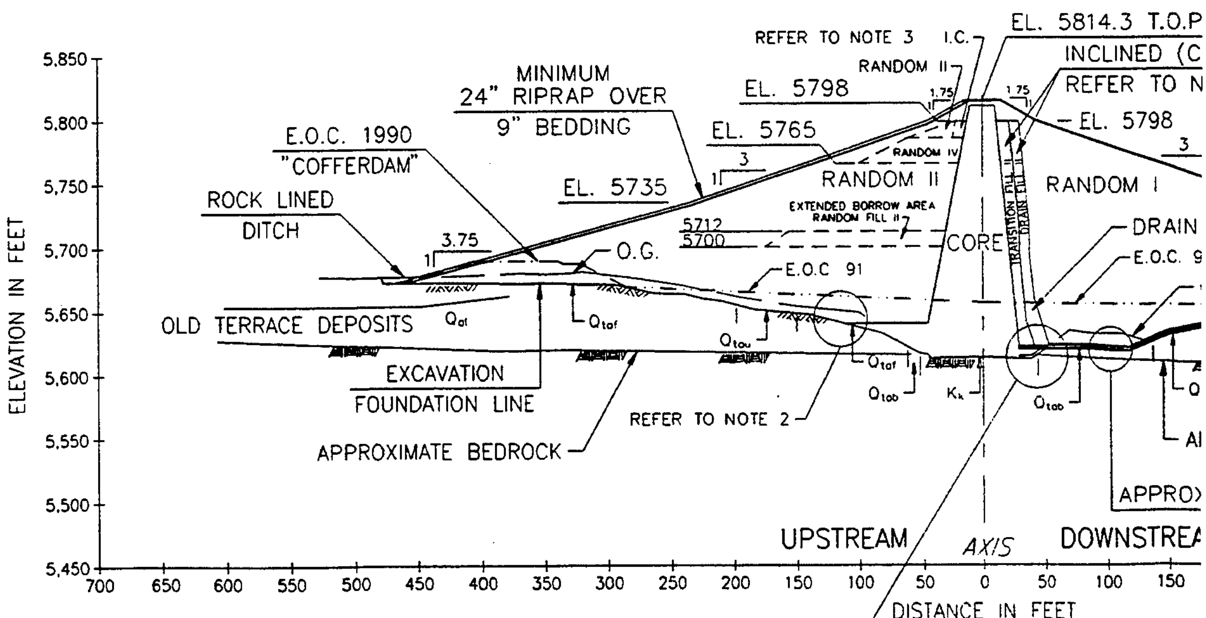
SUBMITTED:	APPROVED:
MICHAEL D. RAMSBOTHAM	for John [signature] RESIDENT ENGINEER
DR. BY: GEB / CHECKED BY: MDR	PLATE 6

1"=150

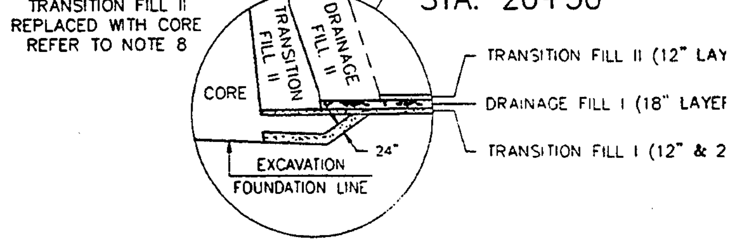
2



STA. 22+50



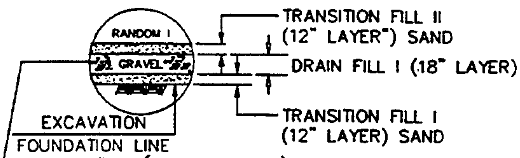
STA. 20+50



DETAIL "C"

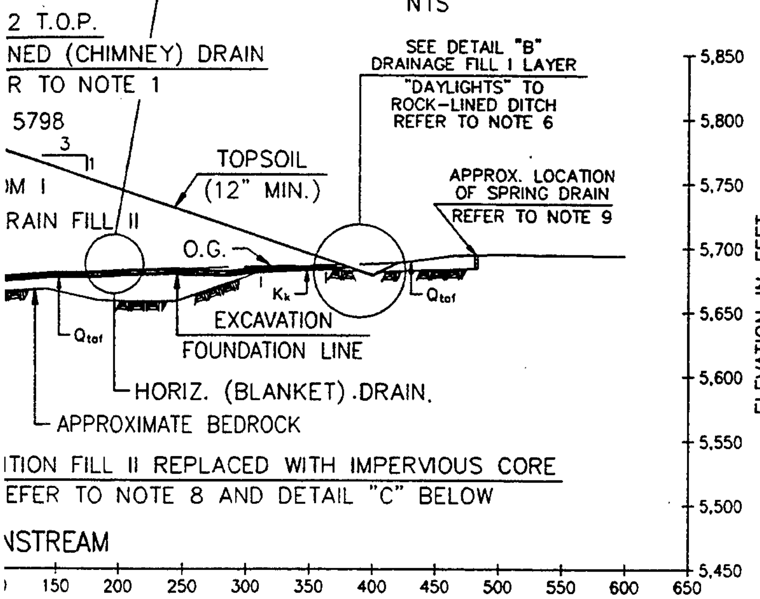
NTS

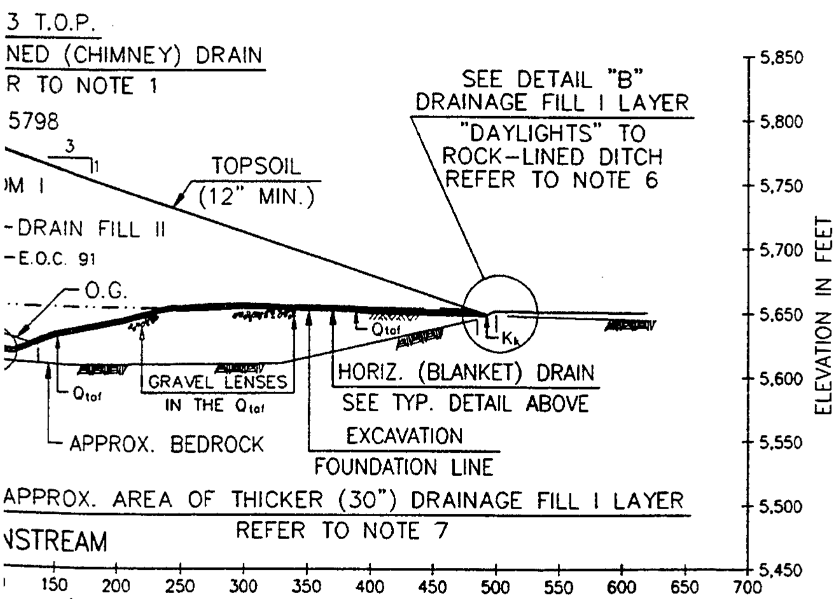
LITTLE DELL PROJECT: PL-07 24 MAY 94 NLB



HORIZ. (BLANKET) DRAIN DETAIL

NTS





(12" LAYER) SAND

8" LAYER) GRAVEL

(12" & 24" LAYERS) SAND

LEGEND:

K_f	FRONTIER FORMATION
K_k	KELVIN FORMATION
Q_{al}	YOUNGER ALLUVIUM
Q_{to}	OLDER ALLUVIUM
Q_{tof}	FINE GRAINED, OLDER ALLUVIUM
Q_{tou}	UPPER GRAVEL, OLDER ALLUVIUM
Q_{tob}	BASAL GRAVEL, OLDER ALLUVIUM
O.G.	ORIGINAL GROUND LINE
OLS	OLD LANDSLIDE
SW	SLOPEWASH
T.O.P.	TOP OF PAVEMENT
E.O.C.	END OF CONSTRUCTION
— · — · —	END OF CONSTRUCTION 1990 (E.O.C. 90)
— · · — · · —	END OF CONSTRUCTION 1991 (E.O.C. 91)
	APPROXIMATE BEDROCK LINE

NOTES:

1. DRAINAGE FILL II AND TRANSITION FILL II ZONES ARE DRAWN AS 8' WIDTHS. ACTUAL ZONE WIDTHS ARE ABOUT 10' (±1'). DRAINAGE FILL II SAND.
2. AT THE ABUTMENTS THE IMPERVIOUS CORE ZONE WAS WIDENED TO SIMPLIFY PLACEMENT. THE IMPERVIOUS CORE ZONE MAY BE AS MUCH AS 15 FT. TO 20 FT. WIDER AT THE ABUTMENT THAN SHOWN.
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4. GEOLOGY ANNOTATIONS INDICATE ONLY WHAT WAS EXPOSED AT THE FOUNDATION ELEVATION.
5. DRAINAGE BLANKET LAYER DIMENSIONS ARE MINIMUM DESIGN THICKNESSES PERPENDICULAR TO THE SLOPE. DRAINAGE FILL I LAYER WAS CAPPED WITH TRANSITION FILL II SAND AT THE ABUTMENTS, EL. 5780 FT.
6. DRAINAGE FILL I LAYER DAYLIGHTS TO THE ROCK LINED DITCH BETWEEN APPROXIMATELY STA. 16+35 TO STA. 24+00.
7. AREA OF THICKENED DRAINAGE FILL I LAYER EXTENDS FROM APPROXIMATELY STA. 16+75 TO STA. 20+75 IN THIS LOW AREA.
8. BETWEEN APPROXIMATELY STA. 19+65 AND STA. 24+65 IMPERVIOUS CORE MATERIAL WAS SUBSTITUTED FOR TRANSITION II IN THIS AREA. A 24" THICK LAYER OF TRANSITION I WAS PLACED/EXTENDED TO THE THEORETICAL CORE LINE.
9. THE SPRING DRAIN INITIALLY CONSISTED OF A 6" DIAMETER SLOTTED PVC IN A GRAVEL FILLED TRENCH 10'± DEEP (MAX.). THE TRENCH IS LOCATED FROM 465 FT. TO 480 FT. DOWNSTREAM BETWEEN STA 24+00 AND STA. 21+50. FLOW IS MEASURED AT THE ORIGINAL SPRING DRAIN BETWEEN -515 FT. AND -532 FT. DOWNSTREAM AND STA. 22+81 AND 22+98. THE SUMP IS A PIT APPROXIMATELY 14' x 14' x 10' DEEP BACKFILLED WITH GRAVEL WITH A 4" DIAMETER PERFORATED COLLECTOR PIPE.

LITTLE DELL LAKE
SALT LAKE CITY STREAMS, UTAH

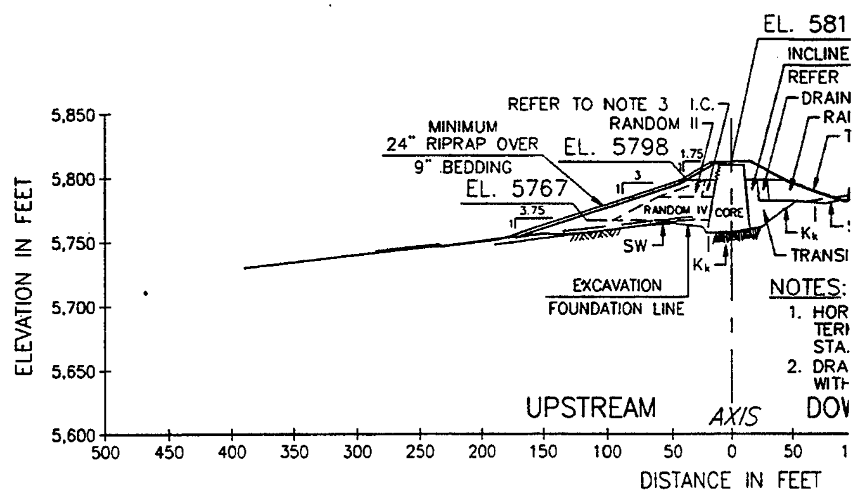
EMBANKMENT SECTIONS (AS-BUILT)
STA. 20+50 AND STA. 22+50

DEPARTMENT OF THE ARMY
SACRAMENTO DISTRICT, CORPS OF ENGINEERS
SACRAMENTO, CALIFORNIA

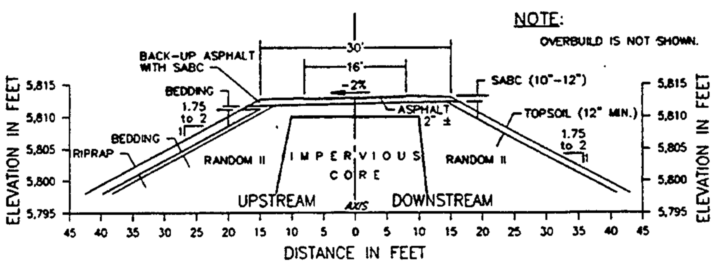
SUBMITTED:			APPROVED:
MICHAEL D. RAMSBOTHAM			RESIDENT ENGINEER
DR. BY	CHECKED BY		
GEB	MDR		PLATE 7

1 = 150

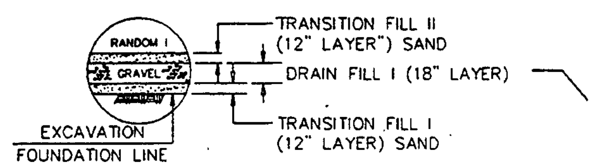
2



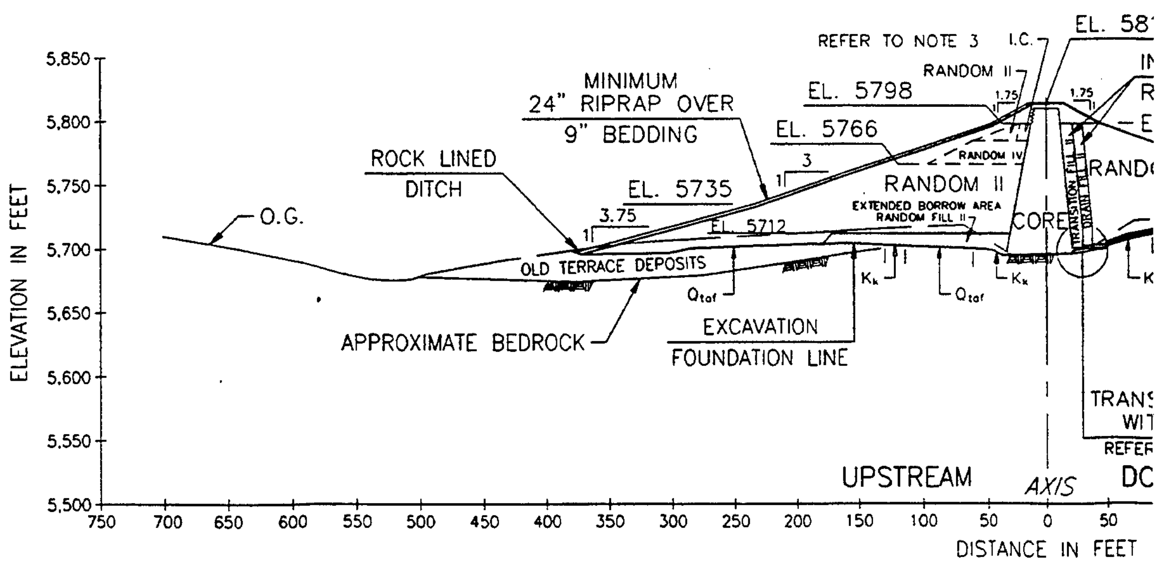
STA. 26+50



TOP OF DAM DETAIL
SCALE: 1" = 30'



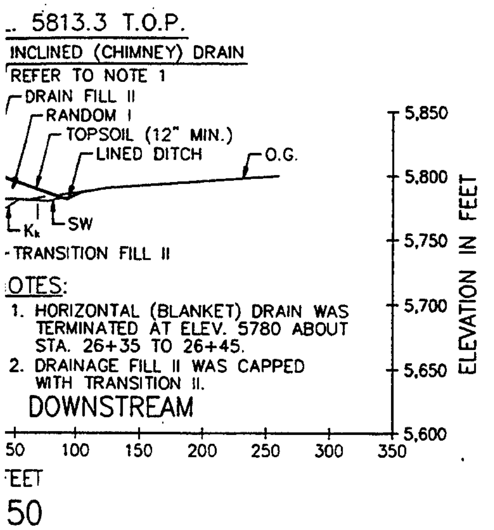
HORIZ. (BLANKET) DRAIN DETAIL
NTS



STA. 24+50

LITTLE DELL PROJECT: PL-08 21 JUL 94 NLB

1

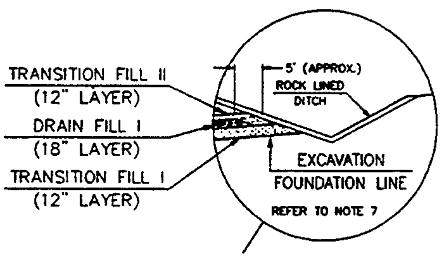


LEGEND:

K_f	FRONTIER FORMATION
K_k	KELVIN FORMATION
Q_{al}	YOUNGER ALLUVIUM
Q_{to}	OLDER ALLUVIUM
Q_{tof}	FINE GRAINED, OLDER ALLUVIUM
Q_{tou}	UPPER GRAVEL, OLDER ALLUVIUM
Q_{tob}	BASAL GRAVEL, OLDER ALLUVIUM
O.G.	ORIGINAL GROUND LINE
OLS	OLD LANDSLIDE
SW	SLOPEWASH
T.O.P.	TOP OF PAVEMENT
E.O.C.	END OF CONSTRUCTION
—·—·—	END OF CONSTRUCTION 1990 (E.O.C. 90)
—··—··—	END OF CONSTRUCTION 1991 (E.O.C. 91)
	APPROXIMATE BEDROCK LINE

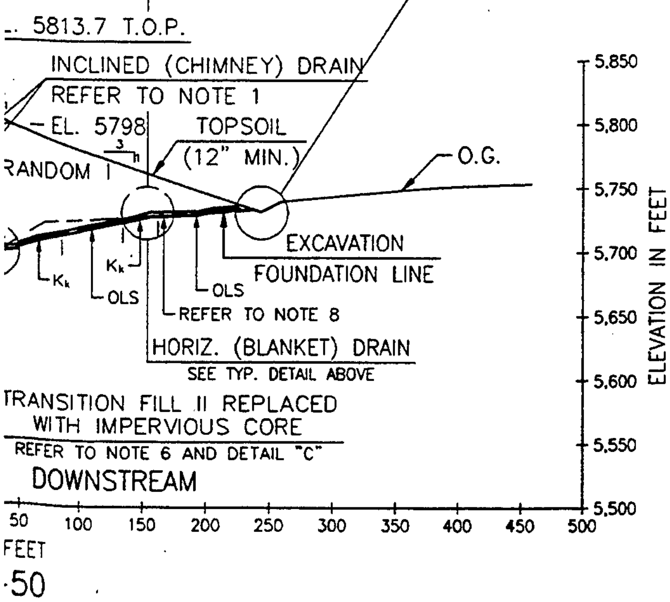
NOTES:

1. DRAINAGE FILL II AND TRANSITION FILL II ZONES ARE DRAWN AS 8' WIDTHS. ACTUAL ZONE WIDTHS ARE ABOUT 10' (±1'). DRAINAGE FILL II CAPPED WITH TRANSITION II SAND.
2. AT THE ABUTMENTS THE IMPERVIOUS CORE ZONE WAS WIDENED TO SIMPLIFY PLACEMENT. THE IMPERVIOUS CORE ZONE MAY BE AS MUCH AS 15 FT. TO 20 FT. WIDER AT THE ABUTMENT THAN SHOWN.
3. IMPERVIOUS CORE TO RANDOM II ZONE LINE LOCATION IS VERY APPROXIMATE AT THIS SECTION/ELEVATION. IMPERVIOUS CORE IS GENERALLY WIDER THAN SHOWN.
4. GEOLOGY ANNOTATIONS INDICATE ONLY WHAT WAS EXPOSED AT THE FOUNDATION ELEVATION.
5. DRAINAGE BLANKET LAYER DIMENSIONS ARE MINIMUM DESIGN THICKNESSES PERPENDICULAR TO THE SLOPE. DRAINAGE FILL I LAYER WAS CAPPED WITH TRANSITION FILL II SAND AT THE ABUTMENTS, EL. 5780 FT.
6. BETWEEN APPROXIMATELY STA. 19+65 AND STA. 24+65 IMPERVIOUS CORE MATERIAL WAS SUBSTITUTED FOR TRANSITION II IN THIS AREA. A 24" THICK LAYER OF TRANSITION I WAS PLACED/EXTENDED TO THE THEORETICAL CORE LINE.
7. DRAINAGE FILL I LAYER WAS ENCAPSULATED WITH TRANSITION SAND FROM ABOUT STA. 24+00 TO THE TOP OF THE BLANKET, ABOUT STA. 26+35.
8. THE OLD LANDSLIDE (OLS) FEATURE WAS ENCOUNTERED BETWEEN STA. 22+60 AND STA. 25+00.
9. THE HORIZONTAL (BLANKET) DRAIN WAS TERMINATED AT ELEVATION 5780 FT. ABOUT STA. 26+35 TO STA. 26+45. DRAINAGE FILL I WAS CAPPED WITH TRANSITION FILL II.



ENCAPSULATED DRAINAGE FILL I DETAIL

NTS



LITTLE DELL LAKE
SALT LAKE CITY STREAMS, UTAH

EMBANKMENT SECTIONS (AS-BUILT)
STATION 24+50 AND STATION 26+50

DEPARTMENT OF THE ARMY
SACRAMENTO DISTRICT, CORPS OF ENGINEERS
SACRAMENTO, CALIFORNIA

SUBMITTED:	APPROVED:
MICHAEL D. RAMSBOTHAM	[signature] RESIDENT ENGINEER

DR. BY	CHECKED BY		
GEB	MDR		PLATE 8

1=150

DESCRIPTION OF MAP UNITS

(Isotopic ages have been recalculated from decay constants accepted by the U.S. Geological survey in 1984)

Qal Alluvium (Holocene)—Boulders to pebble gravel, sand, silt, and clay deposited in channels and flood plains of streams. Thickness as much as 3 m

Qf Alluvial-fan and debris-fan deposits (Holocene and Pleistocene)—Gravel, sand, and silt; locally bouldery. Crudely bedded to nonbedded and poorly sorted. Maximum thickness probably 10 m

Qlr Landslide deposits (Holocene and Pleistocene)—Poorly sorted; particle size ranges from clay to blocks, depending on material involved in sliding; include mudflow, debris-avalanche, and slump deposits

Qoa Old alluvium (Pleistocene)—Gravel, silty gravel, and sandy silt in dissected alluvial fans and alluvium. Includes local marsh deposits. Much of the units in the valley near Keetley is more than 730,000 years old (Sullivan and Nelson, 1983). In Salt Lake valley, upper Pleistocene alluvial deposits merge with regressive-phase deposits of Lake Bonneville. More than 100 m thick in valley near Keetley; 2–7 m thick in Salt Lake valley

Deposits of regressive phase of Lake Bonneville (Pleistocene)

Qpg Sand and gravel deposits—Sandy gravel, gravely sand, and silty gravel. Includes deposits attributed by Miller (1980) to Stansbury lake stand. Thickness 1–4 m

Deposits of the high stand of Lake Bonneville (Pleistocene)

Qbc Silt and clay deposits—Sandy, clayey silt, sand, or silty clay. Massive to thinly bedded. Thickness as much as 8 m

Qbg Sand and gravel deposits—Sand, silty sand, sandy pebble and cobble gravel, and gravelly sand. Thickness 1–30 m

Qtp Till of Pinedale age (Pleistocene)—Poorly sorted bouldery till that forms prominent moraines. As mapped, may include some colluvium, talus, and landslide debris. A few meters thick except in moraines where maximum thickness is 180 m

Qof Older alluvial-fan and debris-fan deposits (Pleistocene)—Poorly sorted gravel, sand, and silt; locally bouldery. Crudely bedded to nonbedded. Occur above present drainage and are inactive. Maximum thickness about 10 m

Qtg Gravel (Pleistocene or Pliocene)—Unconsolidated pebble, cobble, and boulder gravel on Porcupine Ridge and adjacent areas near northeast corner of quadrangle. Apparently gravel is a lag concentrate from underlying conglomerate (unit Toc). Also mapped on Slader Ridge in east-central part of quandrangle. Maximum thickness possibly a few tens of meters

Hooper Canyon Formation (Pliocene?)—Boulders, cobbles, and pebbles in a matrix of sand and silt. Coarse clasts are predominantly subrounded to subangular limestone and quartzite. Caps ridges north of City Creek and lies on erosion surface cut on deformed conglomerate (Tc). Maximum thickness 15 m

Tc Conglomerate (Miocene?)—Pale-brown and light- to medium-gray, well- to poorly cemented, pebble and cobble conglomerate and sandstone. Generally contains coarse, subrounded to subangular clasts of limestone and quartzite, but near Mill Creek southeast of Bountiful, clasts of metamorphic rocks from the Farmington Canyon Complex are numerous. Thickness greater than 500 m

Tkb Light-gray to gray lahar, flow breccia, and tuff—Proportion of tuff increases with distance from volcanic centers. Sandstone and conglomerate composed of volcanic clasts occur distal to volcanic centers. Zircon fission-track age of 35.3 Ma and biotite K-Ar age of 37.5 Ma obtained from flow breccia north of Salt Lake City (Van Horn, 1981). Thickness as much as 500 m in Keetley region

Toc Conglomerate (Oligocene and Eocene?)—Boulder, cobble, and pebble conglomerate containing fragments of sandstone derived from Mesozoic and upper Paleozoic formations; clasts of Nugget Sandstone (Unit J₮n) are conspicuous. Contains a few lahars and beds of tuff and volcanic gravel. Locally rich in clasts of volcanic rock in Porcupine Ridge area in northeastern part of quadrangle. In the adjoining Ogden 30'x60' quadrangle to the north, unit is mapped as basal member of Norwood Tuff. Maximum thickness about 300 m

Wasatch Formation (Eocene and Paleocene)—Moderate-red, grayish-red, pale-red, reddish-brown, and gray sandstone, conglomerate, siltstone, and claystone; contains scattered, thin, lenticular beds of light-purplish-gray to light-gray, nonmarine limestone. Conglomerate clasts range from pebble to boulder size and have a varied lithology from diverse sources. Maximum stratigraphic thickness about 1,500 m in the Mountain Dell–Porterville area on the east side of the Wasatch Range and about 1,200 m north of the Uinta Mountains. In Chalk Creek area, yellowish-gray-weathering conglomerate forms a basal unit as much as 100 m thick overlain by a sequence of variegated sandstone and siltstone. This sandstone and siltstone is overlain by or interfingers with coarse conglomerate to the south, which was derived from Paleozoic and Precambrian rocks of the Uinta uplift. Palynomorphs indicate the lower 200–300 m is of late Paleocene age (Lamerson, 1982; Nichols, 1982; and this report)

Conglomerate dominant

Frontier Formation (Upper Cretaceous)

Kfu Upper member—Light-yellowish-gray marine sandstone, gray marine shale, gray to brown siltstone and silty shale, and coal. Conglomerate, which occurs at the base of the unit as a bed 6–30 m thick in the Coalville area, contains rounded pebbles and cobbles of sandstone and limestone. Conglomeratic beds are numerous along the Weber River valley at Franklin Canyon. In Coalville area units contain middle Coniacian fauna 330 m above base and at top (Ryer, 1976). Thickness 800–1,100 m in Coalville area. Thickness 1,600 m in East Canyon Creek area

Kfo Oyster Ridge Sandstone Member—Light-yellow to gray marine sandstone and pebbly sandstone locally overlain by nonmarine sandstone, siltstone, and silty shale. Contains early middle Turonian ammonite, Collignoniceras woolgari (Cobban and Reeside, 1952). Thickness 60–100 m

Kfl Lower member—Light- to dark-gray marine shale, sandstone, conglomeratic sandstone, and silty shale; coal; and gray, light-red, grayish-red, and green claystone. Contains earliest Turonian fossils about 1,000 m above base and early middle Turonian fossils in the upper 240 m in Coalville area (Ryer, 1976). Thickness 1,370 m in Coalville area and about 1,800 m along East Canyon Creek

Kfcg Conglomerate facies—Conglomerate containing interbeds of sandstone and, rarely, of red and gray clay. Conglomerate contains rounded pebbles and cobbles of sandstone and limestone from the Mesozoic and upper Paleozoic section. Locally contains boulders as much as 1 m in diameter. Three tongues of conglomerate in East Canyon Creek area merge to the west into a body 1,300 m thick

Kelvin Formation (Lower Cretaceous)

Kk Upper member—Yellowish-gray, grayish-red, and light- to moderate-red sandstone; gray, reddish-brown, and grayish-red siltstone and claystone; and conglomerate. Conglomerate beds thicker and more numerous west of East Canyon Creek; contains pebbles and cobbles of sandstone, siltstone, and minor amounts of limestone. Unit about 1,300 m thick in Turner Hollow area; thins to west and south. About 470 m thick near head of Parleys Canyon

Kkp Parleys Member—Light- to pale-gray limestone associated with pale-lavender-gray siltstone containing limestone nodules; reddish-brown siltstone, pale-brown to pale-reddish-brown sandstone, and conglomerate. About 50 m thick

Jp Preuss Sandstone (Middle Jurassic)—Reddish-brown, grayish-red, and light- to moderate-red silty sandstone, sandstone, and silty shale. Contains anhydrite and salt in the subsurface in the Chalk Creek area and east of Franklin Canyon (Lamerson, 1982). About 300 m thick, but locally has been thickened due to deformation and flowage of salt, anhydrite, and associated shales

Jt Twin Creek Limestone (Middle Ju
limestone and some beds of
Thickness ranges from 850 r

J₮n Nugget Sandstone (Jurassic? an
white quartz sandstone. Cros
ranges from 400 m in Parle

Ankareh Formation

₮au Upper member (Upper Triassic
sandstone. Thickness about

₮ag Garta Member (Upper Triassic)
quartzite. Thickness as much

₮am Mahogany Member (Lower Tria
limestone beds. Thickness ra
Mountains

₮t Thaynes Limestone (Lower Trias
siltstone containing beds of
and dark-greenish-gray silts
Thickness ranges from 600 r

₮w Woodside Formation (Lower Tria
siltstone, and fine-grained s
few tens of meters of green
120 m north of Red Butte C

₱pc Park City Formation and related
limestone, calcareous siltstor
phosphatic shale which is ab
Phosphoria Formation). Thick
to 600 m at South Fork Dry

₱w Weber Sandstone (Pennsylvanian
calcareous sandstone contair
Thickness generally 300–500
where thinned by bedding fa
of head of American Fork C
Middle Pennsylvanian in Wasc
Mountains upper part may b

₱r Round Valley Limestone (Lower
fossiliferous limestone contai
light-green shale and siltsto
Pale-reddish-orange silicified
Wasatch Range in City Creek

Doughnut Formation (Upper Miss
dark-gray to black chert an
locally reddish shale at the
silty limestone. Black shale
sandstone occurs in Uinta M
Uinta Mountains

Mgb Great Blue Formation (Upper Mi
only in a fault slice near Bl

Mh Humburg Formation (Upper Miss
breccia containing beds of r
rare interbeds of red siltstor

Md Deseret Limestone (Upper and L
containing abundant lenses
phosphatic shale and thin-b
Thickness 140–295 m

Mg Gardison Limestone(Lower Missis
limestone. Occurs only in Wa

Pinyon Peak Limestone (Upper D
containing interbeds of gray
Thickness 50–60 m

Ds Stansbury Formation (Upper Dev
sandstone and calcareous si
bright-red shale. Basal part
coarse-grained dolomite; an
northeast of Salt Lake City.

Maxfield Limestone (Middle Caml
oolitic dolomite; middle mem
member of massive, dark-g
laminae. Occurs only in Wasa

Ophir Formation (Middle Cambri
sandstone; middle member
lower member of olive-gray,
Canyons area. North of City

Tintic Quartzite (Middle and Low
white, pale-yellowish-gray, c
Thickness 250–600 m in Wa
locally are preserved below

Ars Schist and gneiss (Archean)—Bi
sillimanite-biotite schist, sill
and less abundant layers of
Pegmatite dikes and sills; p
those with indistinct contact
m long, but a few are seve

Arsq Schist, gneiss, and quartzite (A
schist, sillimanite-garnet-bio
pale-yellowish-green quartzi
of the unit, has a grain size
heavy mineral partings. Cont

iddle Jurassic)—Thin- to medium-bedded, gray, light-gray, and purplish-gray
>eds of grayish-red to brown siltstone and sandstone. Locally fossiliferous.
ı 850 m near Parleys Canyon to 400 m near Peoa
sic? and Triassic?)—Pale-grayish-orange, fine-grained sandstone, and
ie. Crossbedded in upper part, planar bedded in lower part. Thickness
ı Parleys Canyon to 380 m near Peoa

Triassic)—Moderate-red, grayish-red, and grayish-purple mudstone and fine-grained
about 210 m in Wasatch Range and 110 m in western Uinta Mountains
'riassic)—White to pale-purple, massive, crossbedded, coarse-grained to pebbly
s much as 70 m in Wasatch Range and 20–30 m in Uinta Mountains
er Triassic)—Purplish-gray and pale-red sandstone, mudstone, and a few thin
ness ranges from 260 m in Wasatch Range to 225 m on northwest flank of Uinta

r Triassic)—Light-gray, thin- to thick-bedded limestone and brownish-gray
eds of light-gray sandstone, pale-red silty limestone, light-gray shaly limestone,
ay siltstone and shale. Locally contains pelecypods, gastropods, and ammonites.
ı 600 m north of Red Butte Creek to 215 m on northwest flank o Uinta Mountains
er Triassic)—Grayish-red, grayish-purple, reddish-brown, and moderate-red shale,
ained sandstone; thin white limestone beds; and grayish-red siltstone. Locally, a
f green or greenish-gray shale and siltstone at the base. Thickness ranges from
Butte Creek east of Salt Lake City to 300 m near Park City
related rocks (Permian)—Fossiliferous and cherty, gray to pinkish-gray
siltstone, and cherty sandstone; near middle of unit is a dark-gray,
h is about 30 m thick (Meade Peak Phosphatic Shale Member of
). Thickness ranges from 200 m at Mill Creek southeast of Salt Lake City
ork Dry Creek northeast of Salt Lake City
Ivanian)— Pale-yellowish-gray to white, crossbedded, quartzitic and
containing a few beds of light-gray to white limestone and dolomite.
)0–500 m, but ranges from 150 to 750 m south of City Creek Canyon,
ding faults and thickened by folding or fault repetition, and 600 m east
Fork Canyon along the south-central edge of the quadrangle. Unit is
in Wasatch Range (Van Horn and Crittenden, 1988), but in Uinta
may be younger
Lower Pennsylvanian)—Light-gray-weathering, gray to dark-gray,
containing gray and reddish-gray chert and interbeds of gray and
siltstone, grayish-red silty shale, and sandstone and sandy limestone.
silicified fossils are characteristic. Thickness ranges from 300 m in
y Creek area to 60 m on eastern edge of quadrangle
>er Mississippian)—Medium-gray, thinbedded limestone containing pods of
ıert and abundant fossils; a 10–30-m-thick zone of black, greenish, or
at the base contains thin beds of greenish-gray to rusty-weathering,
shale containing thin beds of dark-gray limestone and rusty-weathering
Jinta Mountains. Thickness about 130 m in Wasatch Range and 65 m in

>per Mississippian)—Pale-gray, thickbedded, fine-grained limestone. Identified
ıear Black Mountain northeast of Salt Lake City. Thickness 100 m
er Mississippian)—Medium- to dark-gray limestone, dolomite, and limestone
ds of reddish-brown- to yellowish-gray-brown-weathering sandstone and
siltstone. Thickness 120–280 m
r and Lower Mississippian)—Thick-bedded dolomite and limestone locally
enses and pods of dark-gray chert. A 10–12 m-thick zone of black
thin-bedded limestone at base. Occurs only in Wasatch Range.

Mississippian)—Medium- to dark-gray, thin- to thick-bedded, fossiliferous
y in Wasatch Range. Thickness about 200 m
Upper Devonian)—Pale-tan to pale-gray, thin-bedded, nodular limestone
of gray shale. Occurs only north and northeast of Salt Lake City.

per Devonian)—Pale-gray to yellowish-gray, coarse-grained, crossbedded
eous siltstone; yellowish-weathering silty limestone; and grayish-red to
al part contains pale-gray to white, laminated dolomite; dark-gray,
iite; and a quartzite bed 1 m thick at the base. Occurs only north and
e City. Thickness about 150 m
le Cambrian)—Contains upper member of dark-gray, medium-bedded,
lle member of mottled dolomite, limestone, and nodular shale; and lower
dark-gray, mottled dolomite and limestone having yellowish-gray silty
in Wasatch Range. Thickness is 360 m north of City Creek
Cambrian)—Contains upper member of blocky-weathering, calcareous
ember of thin-bedded limestone having yellowish-gray silty laminae; and
e-gray, micaceous shale. Thickness is 125 m in Big and Little Cottonwood
of City Creek, members are not distinguishable and thickness is only 57 m
and Lower Cambrian)—Medium- to thick-bedded, fine- to coarse-grained,
-gray, and pale-reddish-brown quartzite; conglomeratic beds in lower 100 m.
ı in Wasatch Range. Discontinuous lenses of unit as much as 100 m thick
below pre-Late Devonian unconformity around Uinta Mountains
ean)—Biotite-feldspar-quartz gneiss, garnet-biotite-feldspar-quartz gneiss,
iist, sillimanite-garnet-biotite schist and gneiss, hornblende-biotite schist,
yers of white, coarse-grained quartzite; lenses and layers of amphibolite.
sills; pegmatites with sharp contacts tend to be discordant and to cut
contacts. Discordant pegmatites with sharp contacts are generally 10–30
e several hundred meters long
tzite (Archean)—Includes biotite-feldspar-quartz schist, sillimanite-biotite
net-biotite schist and gneiss, and interlayered, coarse-grained, white to
quartzite in beds as much as 10 m thick. Quartzite dominates much
ain size of 4–5 mm; contains some light-green muscovite and a few
is. Contact with units Afs is gradational

LEGEND:

Contact

Fault—Dashed where approximate or inferred; dotted where concealed. Many faults have a complex history; only the sense of most recent movement shown on map. Relative movement shown on cross section by arrow; double-headed arrow indicates opposite movement sense at different times.
A, away from observer, T, toward observe

High-angle—Bar and ball on downthrown side

Thrust—Sawteeth on upper plate

Folds—Arrow shows direction of plunge where known. Dashed where approximate or inferred: dotted where concealed

Anticline

Overturned anticline

Syncline

Overturned syncline

30 Strike and dip of bedding
Inclined

60 Overturned

Vertical

40 Strike and dip of foliation and compositional layering where parallel
Inclined

60 Strike and dip of foliation
Inclined

REFERENCE

Geologic map of the Salt Lake City 30' x 60' quadrangle, North-Central Utah, and Uinta County, Wyoming. . .
by Bruce Bryant 1990

Palynologic data from Cretaceous and lower Tertiary rocks in the Salt Lake City 30' x 60' quadrangle. . .
by D. J. Nichols and Bruce Bryant

LITTLE DELL LAKE
SALT LAKE CITY STREAMS, UTAH

MAIN DAM
REGIONAL GEOLOGY
DESCRIPTION OF MAP UNITS

DEPARTMENT OF THE ARMY
SACRAMENTO DISTRICT, CORPS OF ENGINEERS
SACRAMENTO, CALIFORNIA

SUBMITTED:			APPROVED:
CARL E. COLE RESIDENT GEOLOGIST			RESIDENT ENGINEER
ERE		BAB	PLATE 9

DESCRIPTION OF MAP UNITS

(Isotopic ages have been recalculated from decay constants accepted by the U.S. Geological survey in 1984)

Qal Alluvium (Holocene)—Boulders to pebble gravel, sand, silt, and clay deposited in channels and flood plains of streams. Thickness as much as 3 m

Qf Alluvial-fan and debris-fan deposits (Holocene and Pleistocene)—Gravel, sand, and silt; locally bouldery. Crudely bedded to nonbedded and poorly sorted. Maximum thickness probably 10 m

Qls Landslide deposits (Holocene and Pleistocene)—Poorly sorted; particle size ranges from clay to blocks, depending on material involved in sliding; include mudflow, debris-avalanche, and slump deposits

Qoa Old alluvium (Pleistocene)—Gravel, silty gravel, and sandy silt in dissected alluvial fans and alluvium. Includes local marsh deposits. Much of the units in the valley near Keetley is more than 730,000 years old (Sullivan and Nelson, 1983). In Salt Lake valley, upper Pleistocene alluvial deposits merge with regressive-phase deposits of Lake Bonneville. More than 100 m thick in valley near Keetley; 2–7 m thick in Salt Lake valley

Deposits of regressive phase of Lake Bonneville (Pleistocene)

Qpg Sand and gravel deposits—Sandy gravel, gravely sand, and silty gravel. Includes deposits attributed by Miller (1980) to Stansbury lake stand. Thickness 1–4 m

Deposits of the high stand of Lake Bonneville (Pleistocene)

Qbc Silt and clay deposits—Sandy, clayey silt, sand, or silty clay. Massive to thinly bedded. Thickness as much as 8 m

Qbg Sand and gravel deposits—Sand, silty sand, sandy pebble and cobble gravel, and gravelly sand. Thickness 1–30 m

Qtp Till of Pinedale age (Pleistocene)—Poorly sorted bouldery till that forms prominent moraines. As mapped, may include some colluvium, talus, and landslide debris. A few meters thick except in moraines where maximum thickness is 180 m

Qof Older alluvial-fan and debris-fan deposits (Pleistocene)—Poorly sorted gravel, sand, and silt; locally bouldery. Crudely bedded to nonbedded. Occur above present drainage and are inactive. Maximum thickness about 10 m

Qtg Gravel (Pleistocene or Pliocene)—Unconsolidated pebble, cobble, and boulder gravel on Porcupine Ridge and adjacent areas near northeast corner of quadrangle. Apparently gravel is a lag concentrate from underlying conglomerate (unit Toc). Also mapped on Slader Ridge in east-central part of quandrangle. Maximum thickness possibly a few tens of meters

Hooper Canyon Formation (Pliocene?)—Boulders, cobbles, and pebbles in a matrix of sand and silt. Coarse clasts are predominantly subrounded to subangular limestone and quartzite. Caps ridges north of City Creek and lies on erosion surface cut on deformed conglomerate (Tc). Maximum thickness 15 m

Tc Conglomerate (Miocene?)—Pale-brown and light- to medium-gray, well- to poorly cemented, pebble and cobble conglomerate and sandstone. Generally contains coarse, subrounded to subangular clasts of limestone and quartzite, but near Mill Creek southeast of Bountiful, clasts of metamorphic rocks from the Farmington Canyon Complex are numerous. Thickness greater than 500 m

Tkb Light-gray to gray lahar, flow breccia, and tuff-Proportion of tuff increases with distance from volcanic centers. Sandstone and conglomerate composed of volcanic clasts occur distal to volcanic centers. Zircon fission-track age of 35.3 Ma and biotite K-Ar age of 37.5 Ma obtained from flow breccia north of Salt Lake City (Van Horn, 1981). Thickness as much as 500 m in Keetley region

Toc Conglomerate (Oligocene and Eocene?)—Boulder, cobble, and pebble conglomerate containing fragments of sandstone derived from Mesozoic and upper Paleozoic formations; clasts of Nugget Sandstone (Unit JTRn) are conspicuous. Contains a few lahars and beds of tuff and volcanic gravel. Locally rich in clasts of volcanic rock in Porcupine Ridge area in northeastern part of quadrangle. In the adjoining Ogden 30'x60' quadrangle to the north, unit is mapped as basal member of Norwood Tuff. Maximum thickness about 300 m

Wasatch Formation (Eocene and Paleocene)—Moderate-red, grayish-red, pale-red, reddish-brown, and gray sandstone, conglomerate, siltstone, and claystone; contains scattered, thin, lenticular beds of light-purplish-gray to light-gray, nonmarine limestone. Conglomerate clasts range from pebble to boulder size and have a varied lithology from diverse sources. Maximum stratigraphic thickness about 1,500 m in the Mountain Dell-Porterville area on the east side of the Wasatch Range and about 1,200 m north of the Uinta Mountains. In Chalk Creek area, yellowish-gray-weathering conglomerate forms a basal unit as much as 100 m thick overlain by a sequence of variegated sandstone and siltstone. This sandstone and siltstone is overlain by or interfingers with coarse conglomerate to the south, which was derived from Paleozoic and Precambrian rocks of the Uinta uplift. Palynomorphs indicate the lower 200–300 m is of late Paleocene age (Lamerson, 1982; Nichols, 1982; and this report)

Conglomerate dominant

Frontier Formation (Upper Cretaceous)

Kfu Upper member—Light-yellowish-gray marine sandstone, gray marine shale, gray to brown siltstone and silty shale, and coal. Conglomerate, which occurs at the base of the unit as a bed 6–30 m thick in the Coalville area, contains rounded pebbles and cobbles of sandstone and limestone. Conglomeratic beds are numerous along the Weber River valley at Franklin Canyon. In Coalville area units contain middle Coniacian fauna 330 m above base and at top (Ryer, 1976). Thickness 800–1,100 m in Coalville area. Thickness 1,600 m in East Canyon Creek area

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Kfl Lower member—Light- to dark-gray marine shale, sandstone, conglomeratic sandstone, and silty shale; coal; and gray, light-red, grayish-red, and green claystone. Contains earliest Turonian fossils about 1,000 m above base and early middle Turonian fossils in the upper 240 m in Coalville area (Ryer, 1976). Thickness 1,370 m in Coalville area and about 1,800 m along East Canyon Creek

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—biotite schist and gneiss, and interlayered, coarse—grained, white to
rtzite in beds as much as 10 m thick. Quartzite dominates much
size of 4—5 mm; contains some light—green muscovite and a few
Contact with units Afs is gradational

LEGEND:

Contact

Fault—Dashed where approximate or inferred; dotted where concealed. Many faults have a complex history; only the sense of most recent movement shown on map. Relative movement shown on cross section by arrow; double—headed arrow indicates opposite movement sense at different times.
A, away from observer, T, toward observe

High—angle—Bar and ball on downthrown side

Thrust—Sawteeth on upper plate

Folds—Arrow shows direction of plunge where known. Dashed where approximate or inferred: dotted where concealed

Anticline

Overturned anticline

Syncline

Overturned syncline

30 Strike and dip of bedding
Inclined

60 Overturned

Vertical

40 Strike and dip of foliation and compositional layering where parallel
Inclined

60 Strike and dip of foliation
Inclined

REFERENCE

Geologic map of the Salt Lake City 30' x 60' quadrangle, North—Central Utah, and Unita County, Wyoming. . .
by Bruce Bryant 1990

Palynologic data from Cretaceous and lower Tertiary rocks in the Salt Lake City 30' x 60' quadrangle. . .
by D. J. Nichols and Bruce Bryant

LITTLE DELL LAKE
SALT LAKE CITY STREAMS, UTAH

MAIN DAM

REGIONAL GEOLOGY
DESCRIPTION OF MAP UNITS

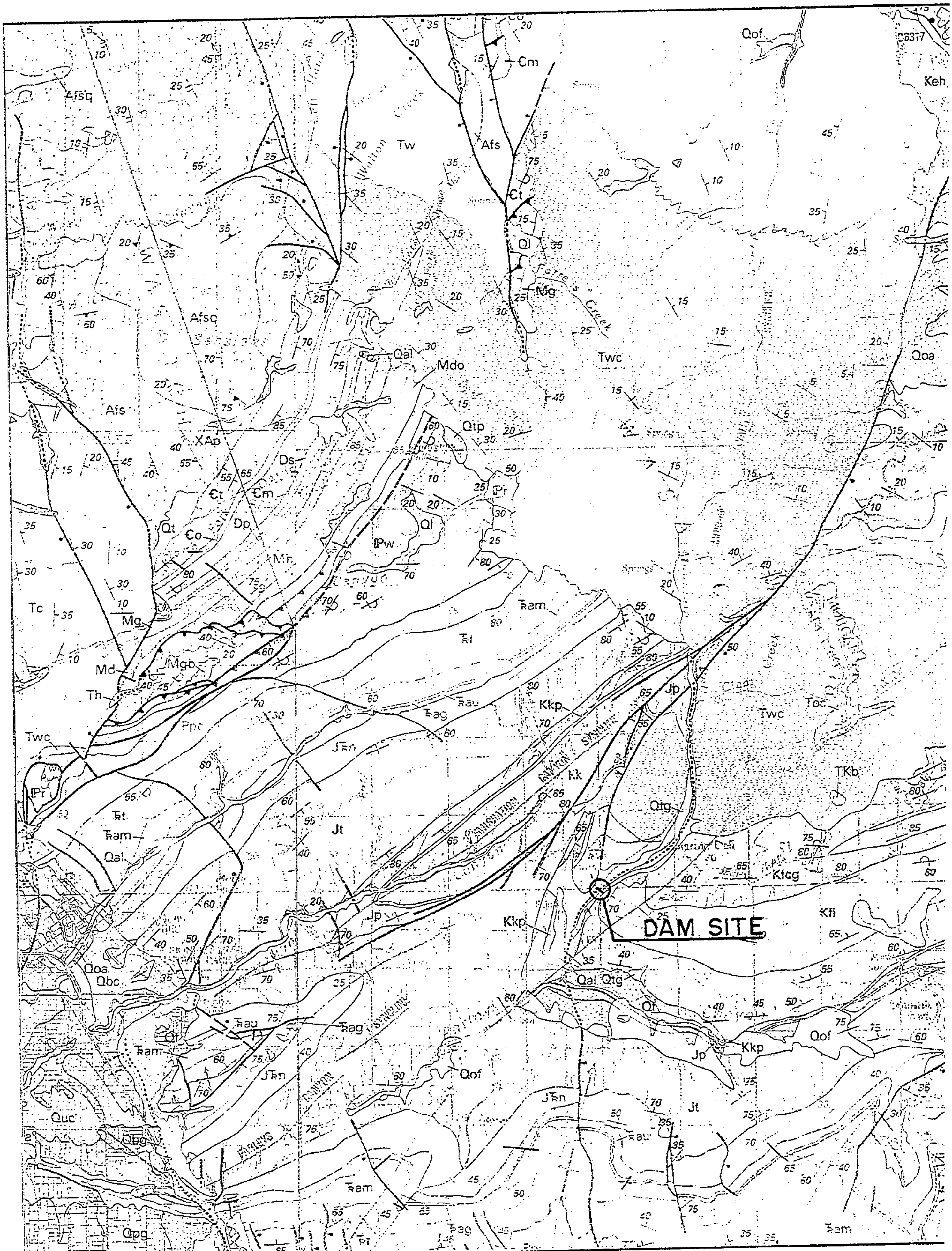
DEPARTMENT OF THE ARMY
SACRAMENTO DISTRICT, CORPS OF ENGINEERS
SACRAMENTO, CALIFORNIA

SUBMITTED:
CARL E. COLE
RESIDENT GEOLOGIST

APPROVED:
RESIDENT ENGINEER

ERE | BAB

PLATE 9


DAM SITE
Afsq
Afs
Tw
Twc
Qof
Keh
Qoa
Mdo
Qtp
XAp
Tc
Kkp
Jp
Jt
Kfcg
Kfi
TKb
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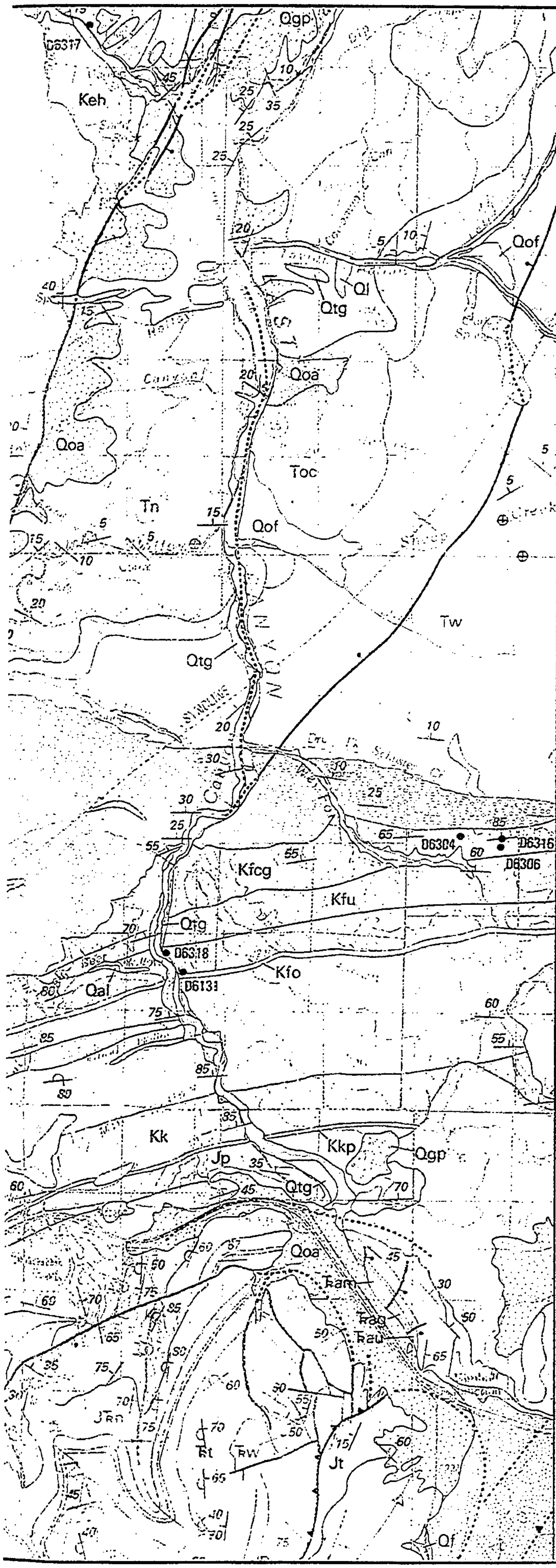
Qal
Quc
Qbg
Qpg



NOTES:

1. Refer to Plate 9 for legend and description of map geologic units.

REFERENCE/SOURCE:

Geologic map of the Salt Lake City 30' x 60' quadrangle, North-Central Utah, and Uinta County, Wyoming. . .
by Bruce Bryant 1990

Palynologic data from cretaceous and lower Tertiary rocks in the Salt Lake City 30' x 60' quadrangle. . .
by D. J. Nichols and Bruce Bryant

GRAPHIC SCALE: (MILES)

0 1 2 3 4 5

SCALE: 1:100,000

LITTLE DELL LAKE
SALT LAKE CITY STREAMS, UTAH

MAIN DAM

REGIONAL GEOLOGY

DEPARTMENT OF THE ARMY
SACRAMENTO DISTRICT, CORPS OF ENGINEERS
SACRAMENTO, CALIFORNIA

SUBMITTED:	APPROVED:
CARL E. COLE RESIDENT GEOLOGIST	RESIDENT ENGINEER

DR. BY	CK. BY	GEOL. BY	FILE No.
ERE		BAB	PLATE 10

2

KELVIN AND FRONTIER FORMATIONS (BEDROCK)

Kf — FRONTIER FORMATION: Light to dark gray marine shale, sandstone, conglomeratic sandstone, and silty shale; coal; and gray, light red, grayish-red, and green claystone.

Kk — KELVIN FORMATION: Yellowish-gray, grayish-red, and light to moderate red sandstone; gray, reddish-brown, and grayish-red siltstone; gray, reddish-brown, and grayish-red siltstone, claystone, and conglomerate.

1 — SANDSTONE: Gray and brownish-gray; hard to very hard where unweathered; generally fine grained; slightly to highly fractured; solutioning evident along many fractures; fractures exhibit widths of one inch or greater in some cases; strikes of most open fractures are generally nearly perpendicular to bedding; calcareous-siliceous matrix; high permeabilities (300+ feet per day (Ft/d)) possible in moderately fractured zones where calcareous matrix has been dissolved along fractures. Numerous springs observed exiting thin beds of hard sandstone along downstream left abutment.

2 — SILTY SANDSTONE/SANDY SILTSTONE: Predominantly reddish-brown and reddish-brown with gray mottling; moderately soft to moderately hard where unweathered; intensely to slightly fractured; fracture widths generally smaller than in the gray sandstone; moderate permeabilities possible through fractures generally not along bedding; air slakes readily in some cases; calcareous; some thin beds and zones of gray sandstone as described above are included in these units.

3 — SILTSTONE: Predominantly brown and reddish-brown with gray mottling, some gray beds; generally moderately soft to soft; intensely to slightly fractured, fractures generally tight with some small openings; fracture orientations highly variable; low permeabilities; usually air slakes readily; calcareous.

4 — CLAYSTONE: Predominantly reddish-brown and gray mottled, some gray beds; generally soft to very soft; often intensely fractured; fractures generally tight and at random orientations; relatively impervious; air slakes readily; variably calcareous.

5 — CLAYSTONE: Light and dark gray, and greenish-gray beds; generally soft to very soft; generally intensely fractured with tight platy fractures; relatively impervious; air slakes readily; generally non-calcareous.

6 — ALTERED BED: Gray to gray-green; variably altered; very soft; intensely sheared; tight fractures.

GEND AND SYMBOLS

6a MONTMORILLONITE: Dark gray-green, variably altered; very soft; intensely sheared; tight fractures; slakes readily in water.

7 CONGLOMERATE: Multicolored coarse material in gray matrix; hard to very hard matrix with very hard quartzitic coarse material where unweathered; generally slightly fractured at surface but highly fractured in cores from depth; large fractures often exceed 1 inch in width, open fractures generally not along bedding; calcareous matrix.

8 INTRAFORMATIONAL BRECCIA: Dark gray to black with multicolored fragments; moderately soft to soft; highly to moderately fractured, fractures mostly tight.

OVERBURDEN

9 SLOPEWASH: Sandy clay and clayey sand with gravel, cobble and boulder size sandstone fragments; brownish-gray and grayish-brown with light gray fragments; generally firm to stiff.

10 FINE GRAINED OLDER ALLUVIUM: Sandy clay; brown to reddish-brown; generally firm with a soft area in the Random II foundation near Sta 19+00; 50 to 95 per cent medium to high plasticity fines with fine and very fine sand; damp where firm, wet where soft.

11 OLDER ALLUVIUM-UPPER GRAVEL BED: Gravel and cobbles with boulders in a sandy and clayey sandy matrix; multicolored coarse material in a reddish brown matrix; dense to very dense; coarse material consists primarily of quartzite with smaller amounts of sandstone and limestone.

12 OLDER ALLUVIUM-BASAL GRAVEL COBBLE BOULDER UNIT: Gravel, cobbles and boulders in a sandy and clayey sandy matrix; multicolored coarse material in a reddish brown matrix; dense; coarse material consists primarily of well rounded quartzite with smaller amounts of sandstone and limestone, generally becomes coarser with depth.

13 YOUNGER ALLUVIUM (HOLOCENE): Boulders to pebble gravel, sand, silt, and clay deposited in channels and flood plains of streams. Light to dark gray, loose to dense.

14 YOUNGER ALLUVIUM - SAND, GRAVEL, COBBLES AND BOULDERS: Light to dark gray, loose to dense.

LEGEND:

	GEOLOGIC CONTACT
7° DIP / STRIKE	JOINT
	SHEAR OR FAULT

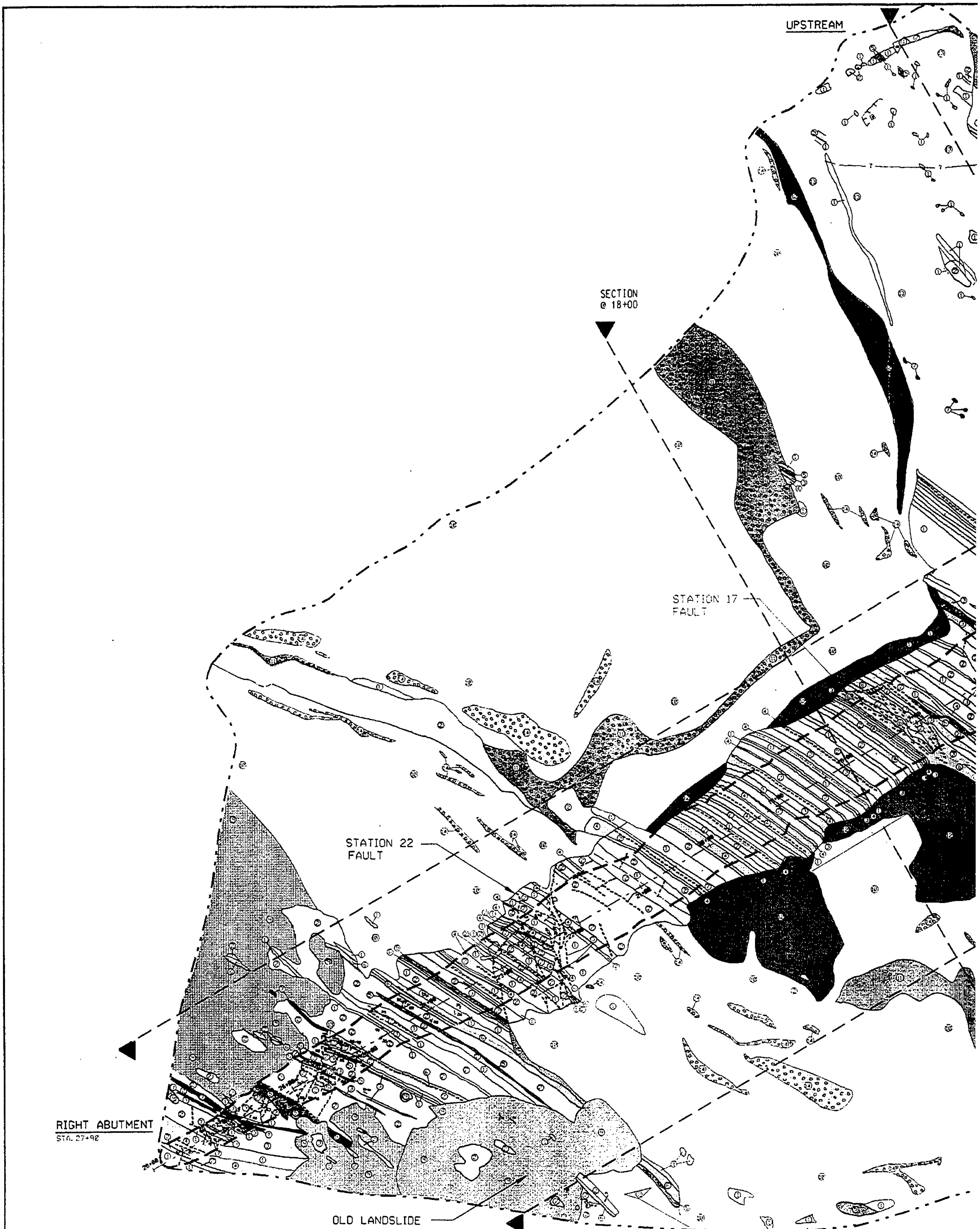
LITTLE DELL LAKE
SALT LAKE CITY STREAMS, UTAH
MAIN DAM
GEOLOGIC MAP
LEGEND AND SYMBOLS

DEPARTMENT OF THE ARMY
SACRAMENTO DISTRICT, CORPS OF ENGINEERS
SACRAMENTO, CALIFORNIA

SUBMITTED: CARL E. COLE, RESIDENT GEOLOGIST
APPROVED: RESIDENT ENGINEER

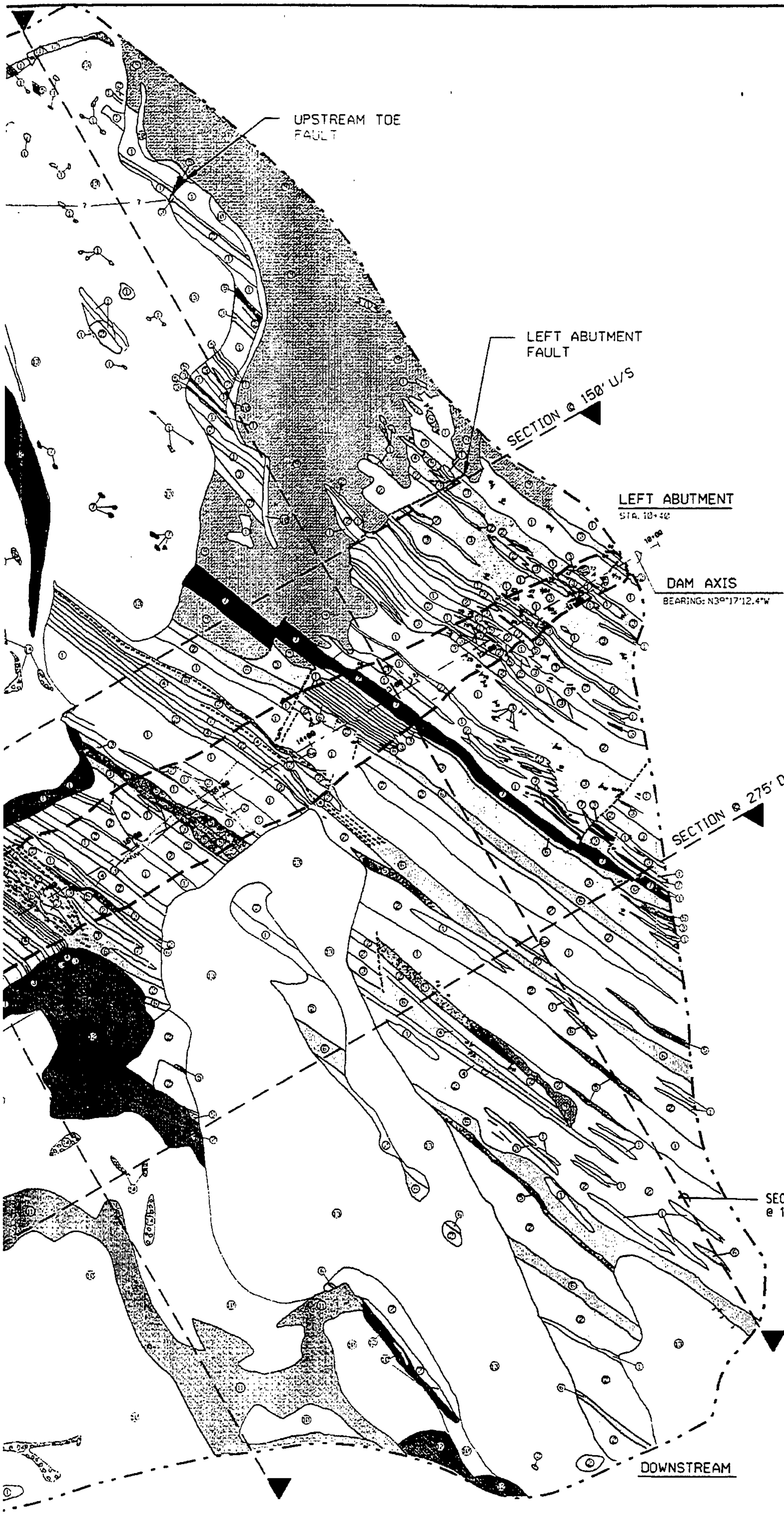
ERE | | CEC | PLATE 11

ed,
ly
vely



UPSTREAM
SECTION
@ 18+00
STATION 17
FAULT
STATION 22
FAULT
RIGHT ABUTMENT
STA. 27+90
OLD LANDSLIDE

(1)



N

NOTE:
REFERENCE PLATE 11 FOR GEOLOGIC MAP LEGEND AND SYMBOLS AND DESCRIPTIONS

GRAPHIC SCALE

0 50' 100' 150' 200' 250'

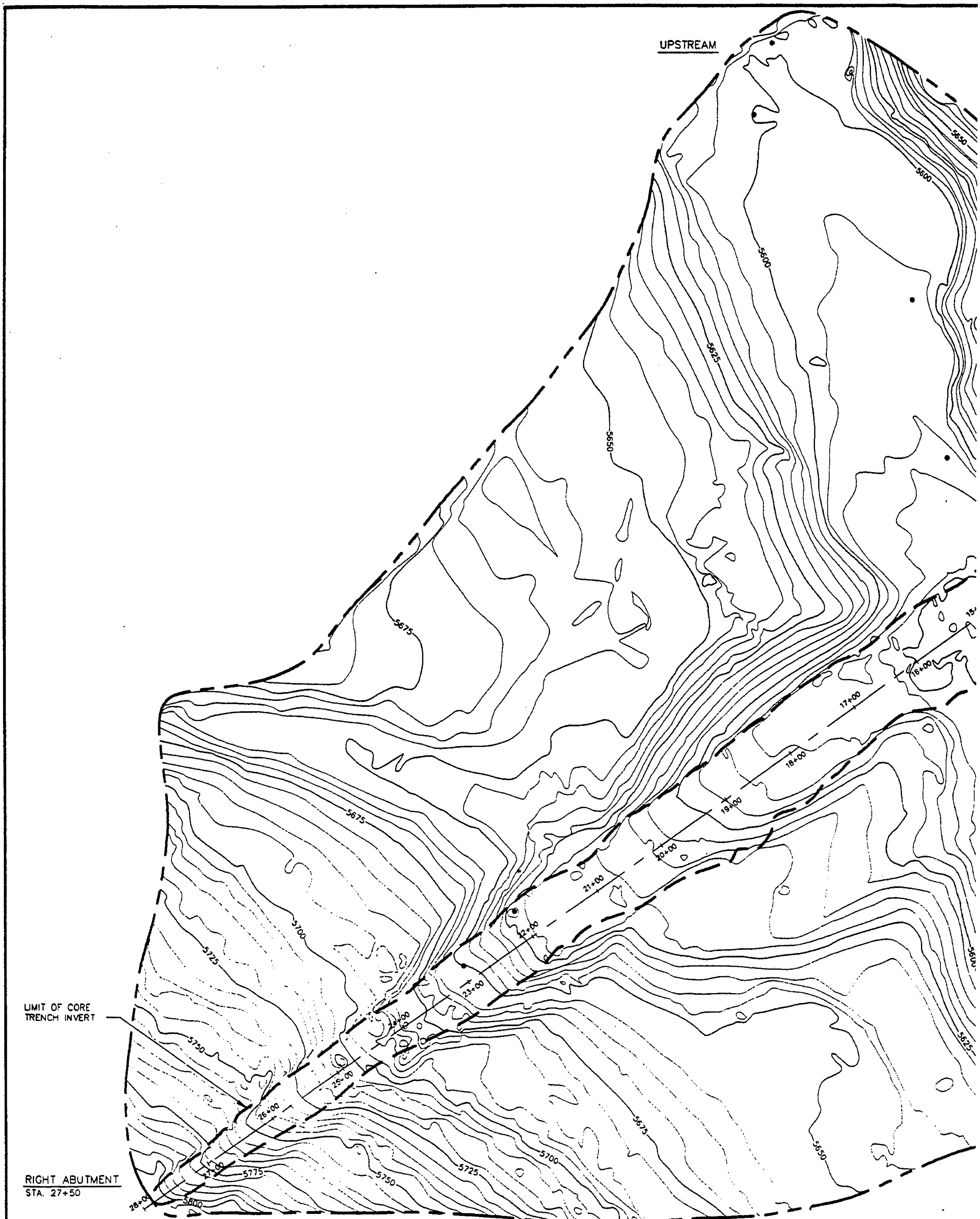
SCALE IN FEET

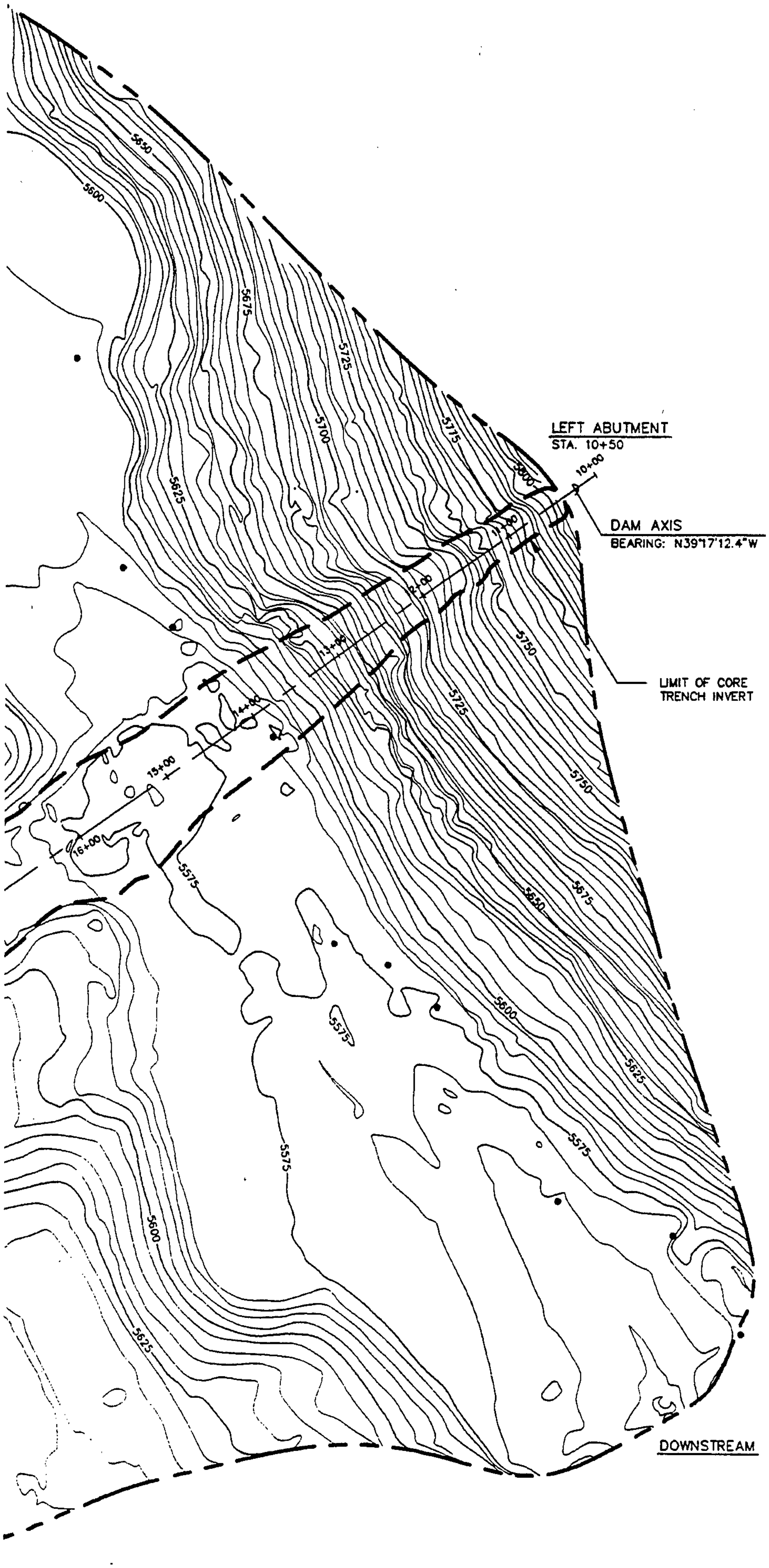
LITTLE DELL LAKE
SALT LAKE CITY STREAMS, UTAH

MAIN DAM
GEOLOGIC MAP
EMBANKMENT FOUNDATION

DEPARTMENT OF THE ARMY
SACRAMENTO DISTRICT, CORPS OF ENGINEERS
SACRAMENTO, CALIFORNIA

SUBMITTED:			APPROVED:
CARL E. COLE RESIDENT GEOLOGIST			RESIDENT ENGINEER
DR. BY: ERE	TR. BY:	CKD. BY: CEC	PLATE 12


UPSTREAM
LIMIT OF CORE TRENCH INVERT
RIGHT ABUTMENT
STA. 27+50
5600
5625
5650
5675
5700
5725
5750
5775
5800
16+00
17+00
18+00
19+00
20+00
21+00
22+00
23+00
25+00
26+00
28+00



GENERAL NOTES:

1. TOPOGRAPHY DEVELOPED FROM CONTRACTOR SUPPLIED DATA DATED SEPT. 1993, BASED ON NCVD OF 1929.
2. TOPOGRAPHY PRODUCED BY U.S. ARMY CORPS OF ENGINEERS ON INTERGRAPH.
3. ELEVATIONS REFER TO MEAN SEA LEVEL DATUM.

LEGEND:

● SUMP LOCATION

GRAPHIC SCALE

0 50' 100' 150' 200' 250'

SCALE IN FEET

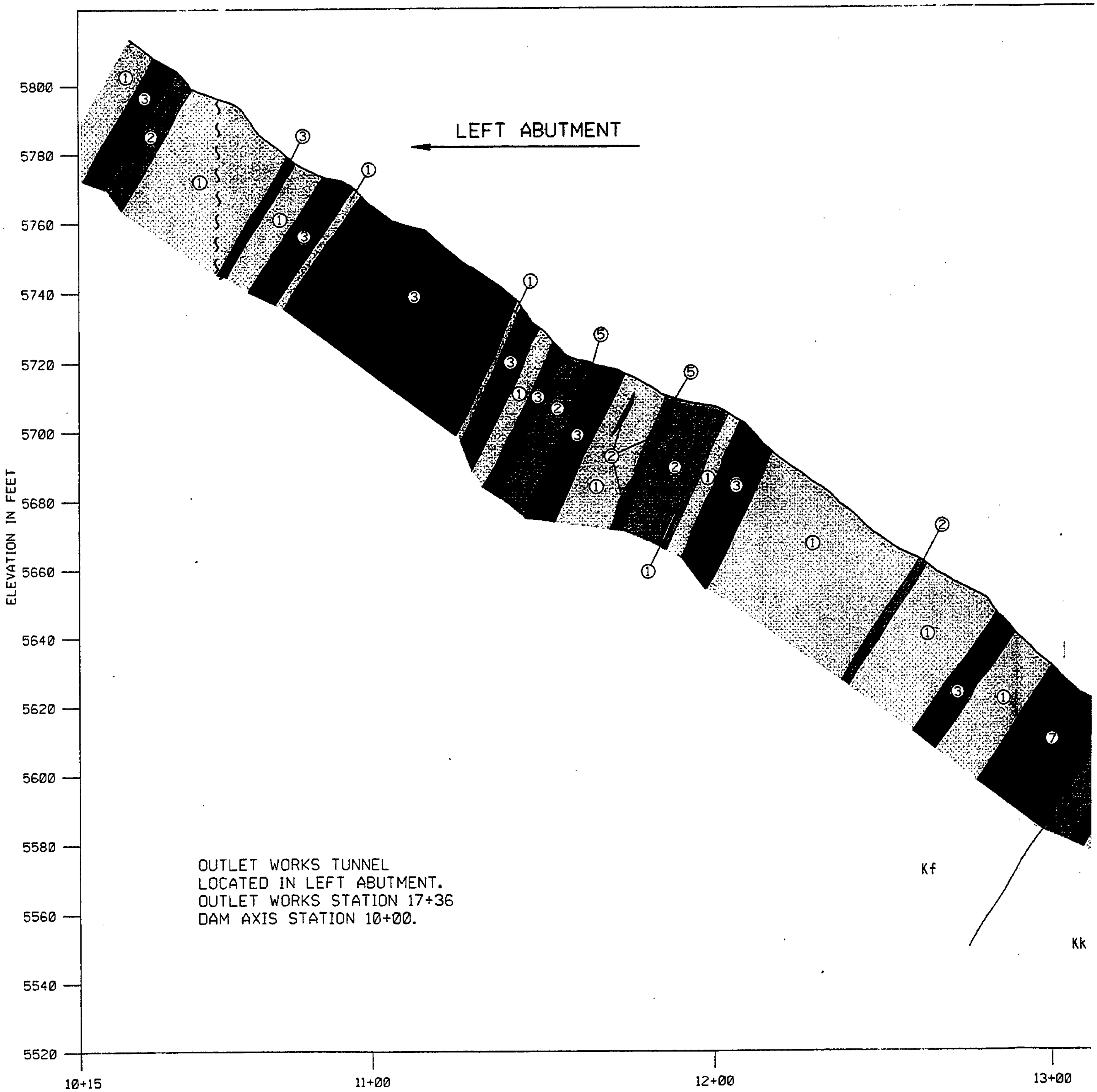
LITTLE DELL LAKE
SALT LAKE CITY STREAMS, UTAH

MAIN DAM
CONTOUR MAP
EMBANKMENT FOUNDATION

DEPARTMENT OF THE ARMY
SACRAMENTO DISTRICT, CORPS OF ENGINEERS
SACRAMENTO, CALIFORNIA

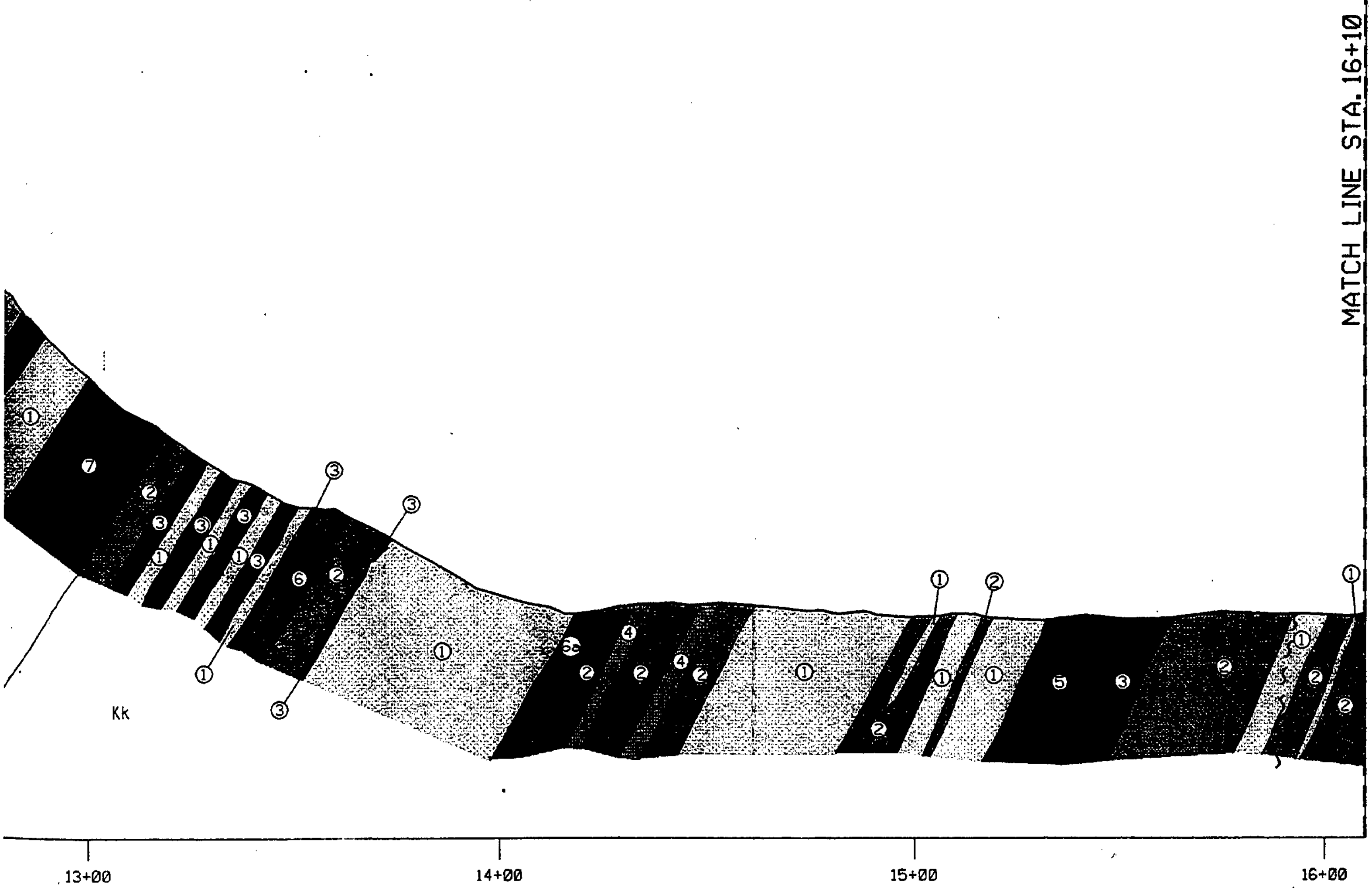
SUBMITTED:			APPROVED:
CARL E. COLE RESIDENT GEOLOGIST			RESIDENT ENGINEER
DR. BY: ERE		CKD. BY: CEC	PLATE 13

2

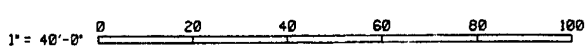

LEFT ABUTMENT
ELEVATION IN FEET
5800
5780
5760
5740
5720
5700
5680
5660
5640
5620
5600
5580
5560
5540
5520
10+15
11+00
12+00
13+00
1
2
3
5
7
Kf
Kk
OUTLET WORKS TUNNEL
LOCATED IN LEFT ABUTMENT.
OUTLET WORKS STATION 17+36
DAM AXIS STATION 10+00.

NOTES:

1. FOR GEOLOGIC MAP LEGEND AND SYMBOLS SEE PLATE 11
2. DAM AXIS BEARING = 39°17'12.4"
3. TOP OF DAM BETWEEN ELEVATION 5813 FT. AND 5815 FT.



GRAPHIC SCALE (FEET)



LITTLE DELL LAKE
SALT LAKE CITY STREAMS, UTAH

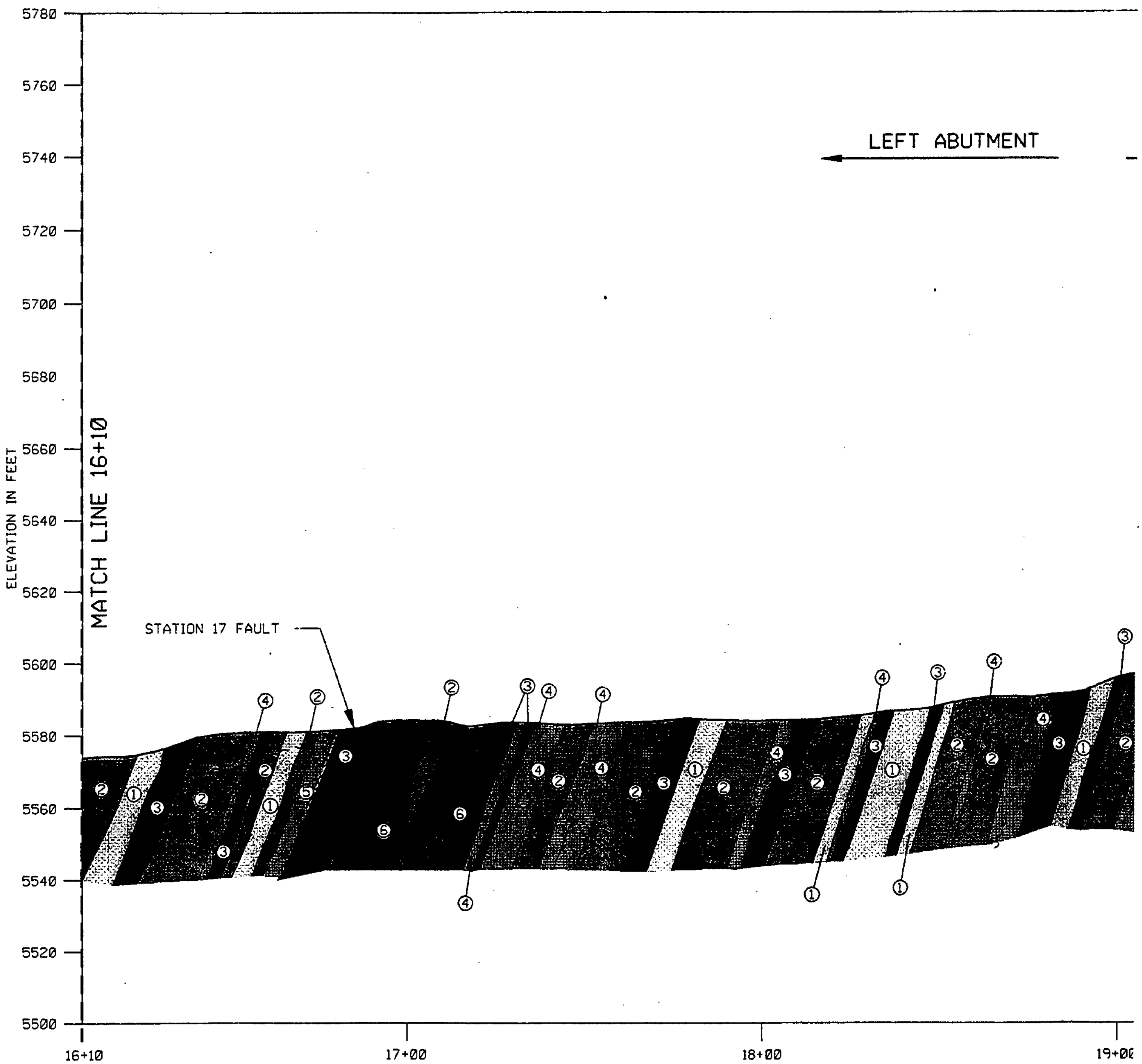
MAIN DAM

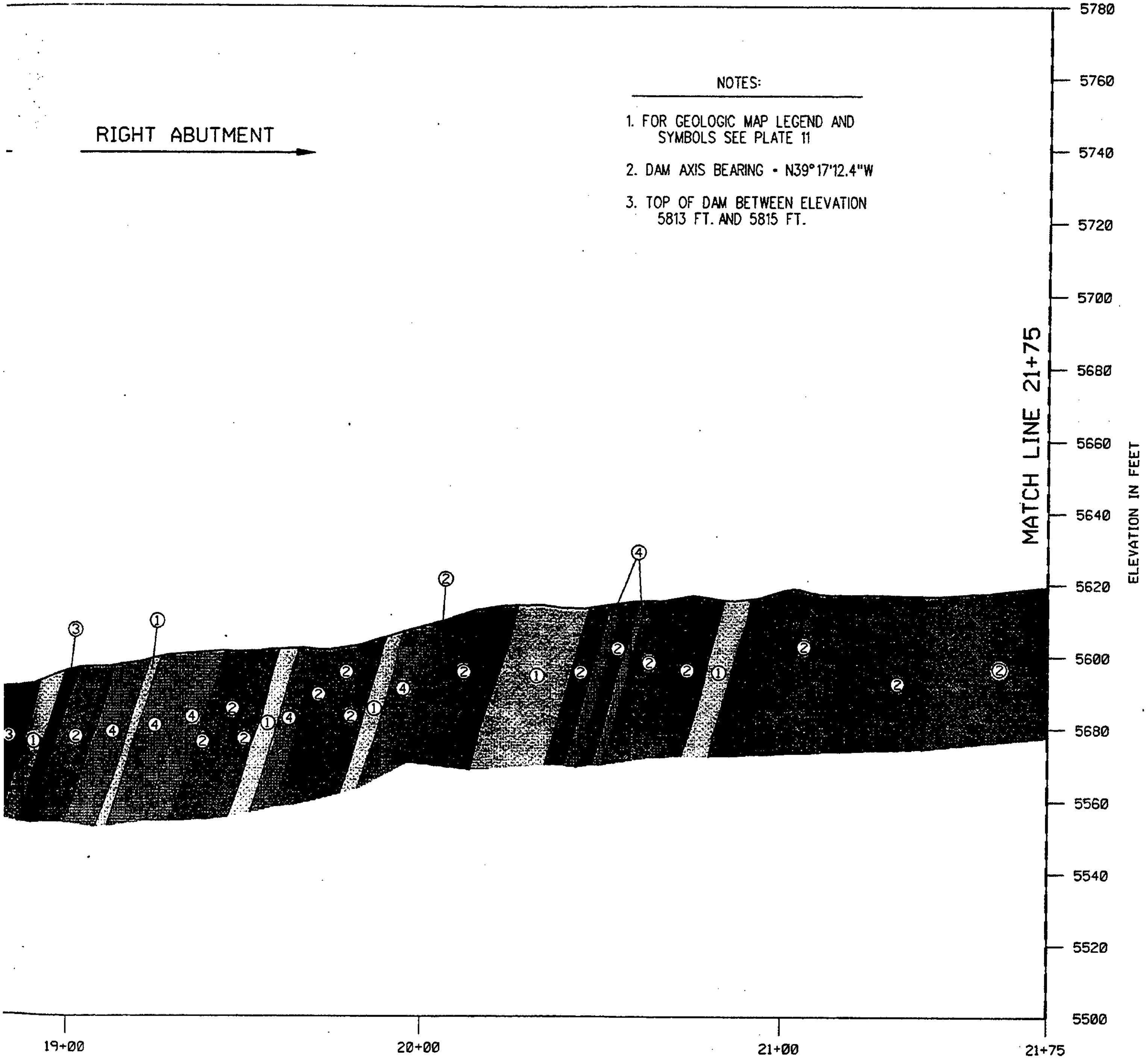
GEOLOGIC SECTION ALONG AXIS OF DAM
STA. 10+15 TO STA. 16+10

DEPARTMENT OF THE ARMY
SACRAMENTO DISTRICT, CORPS OF ENGINEERS
SACRAMENTO, CALIFORNIA

SUBMITTED:			APPROVED:
CARL E. COLE RESIDENT GEOLOGIST			RESIDENT ENGINEER
DR. BY: ERE	TR. BY:	CK. BY: CEC	FILE No. PLATE 14

2


LEFT ABUTMENT
ELEVATION IN FEET
MATCH LINE 16+10
STATION 17 FAULT
5780
5760
5740
5720
5700
5680
5660
5640
5620
5600
5580
5560
5540
5520
5500
16+10
17+00
18+00
19+00



NOTES:

1. FOR GEOLOGIC MAP LEGEND AND SYMBOLS SEE PLATE 11
2. DAM AXIS BEARING • N39°17'12.4"W
3. TOP OF DAM BETWEEN ELEVATION 5813 FT. AND 5815 FT.

GRAPHIC SCALE (FEET)

1" = 40'-0" 0 20 40 60 80 100

LITTLE DELL LAKE
SALT LAKE CITY STREAMS, UTAH

MAIN DAM

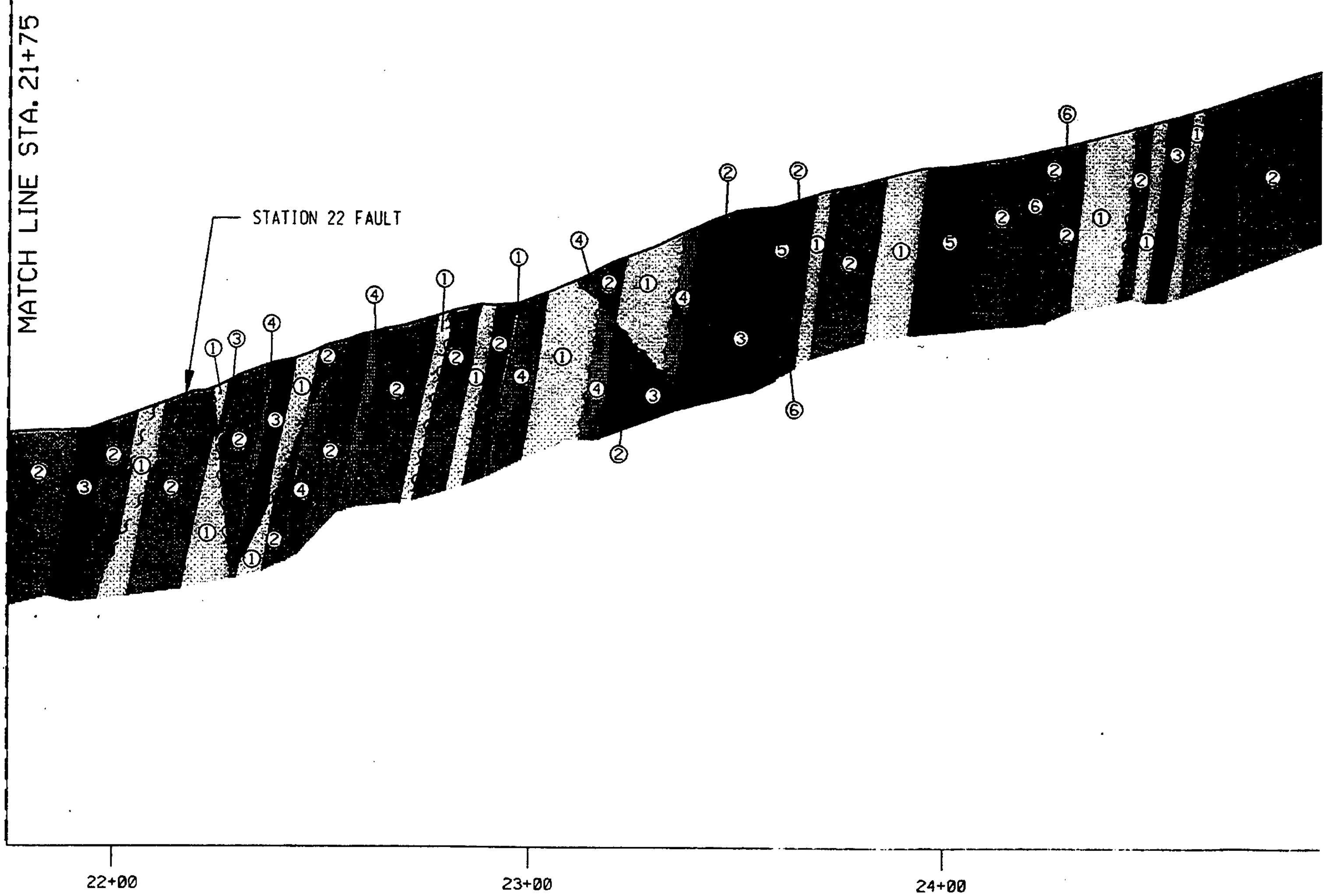
GEOLOGIC SECTION ALONG AXIS OF DAM
STA. 16+10 TO STA. 21+75

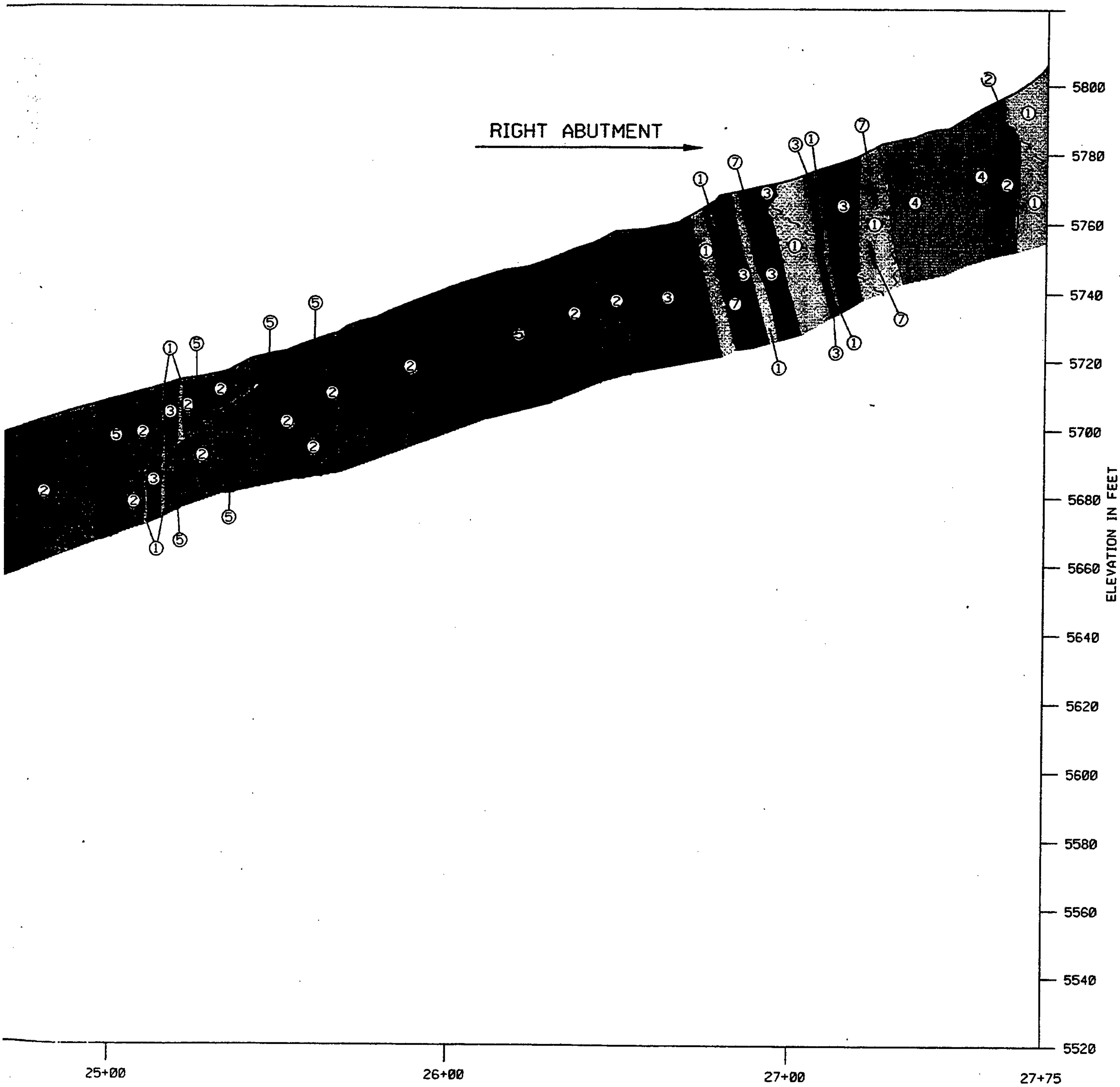
DEPARTMENT OF THE ARMY
SACRAMENTO DISTRICT, CORPS OF ENGINEERS
SACRAMENTO, CALIFORNIA

SUBMITTED:			APPROVED:
CARL E. COLE RESIDENT GEOLOGIST			RESIDENT ENGINEER
DR. BY: ERE	TR. BY:	CH. BY: CEC	FILE No. PLATE 15

NOTE:

1. FOR GEOLOGIC MAP LEGEND AND SYMBOLS SEE PLATE 11
2. DAM AXIS BEARING - N39°17'12.4"W
3. TOP OF DAM BETWEEN ELEVATION 5813 FT. AND 5815 FT.





GRAPHIC SCALE (FEET)

1" = 40'-0" 0 20 40 60 80 100

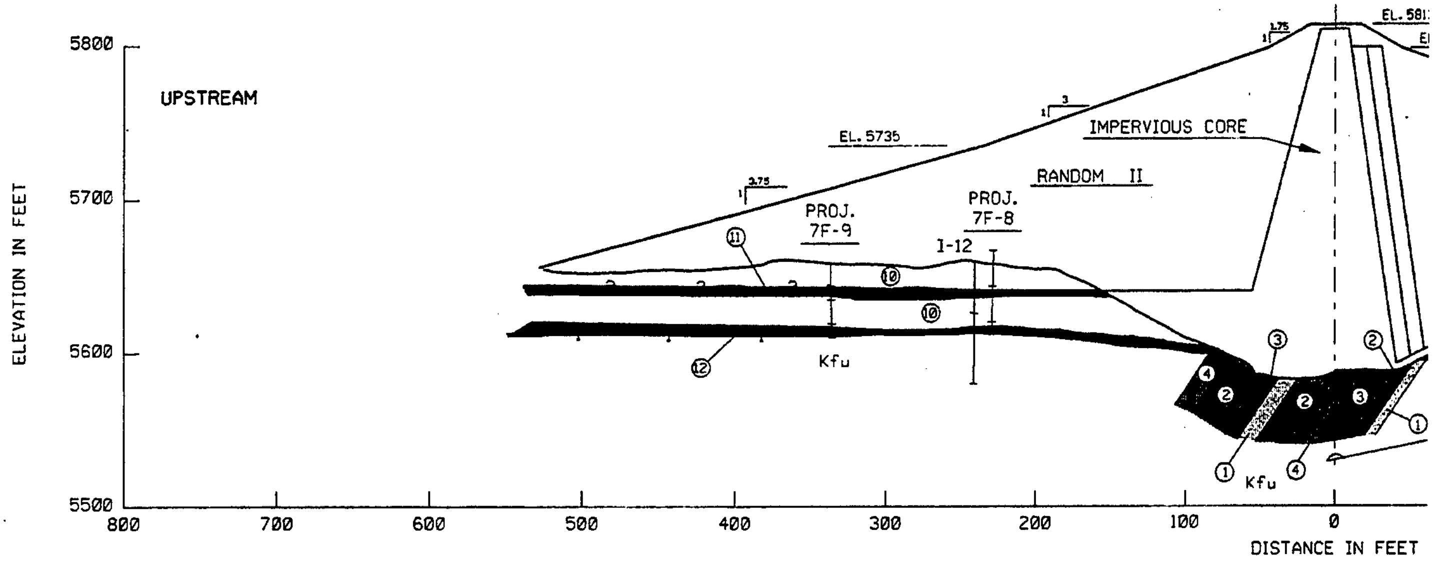
LITTLE DELL LAKE
SALT LAKE CITY STREAMS, UTAH

MAIN DAM

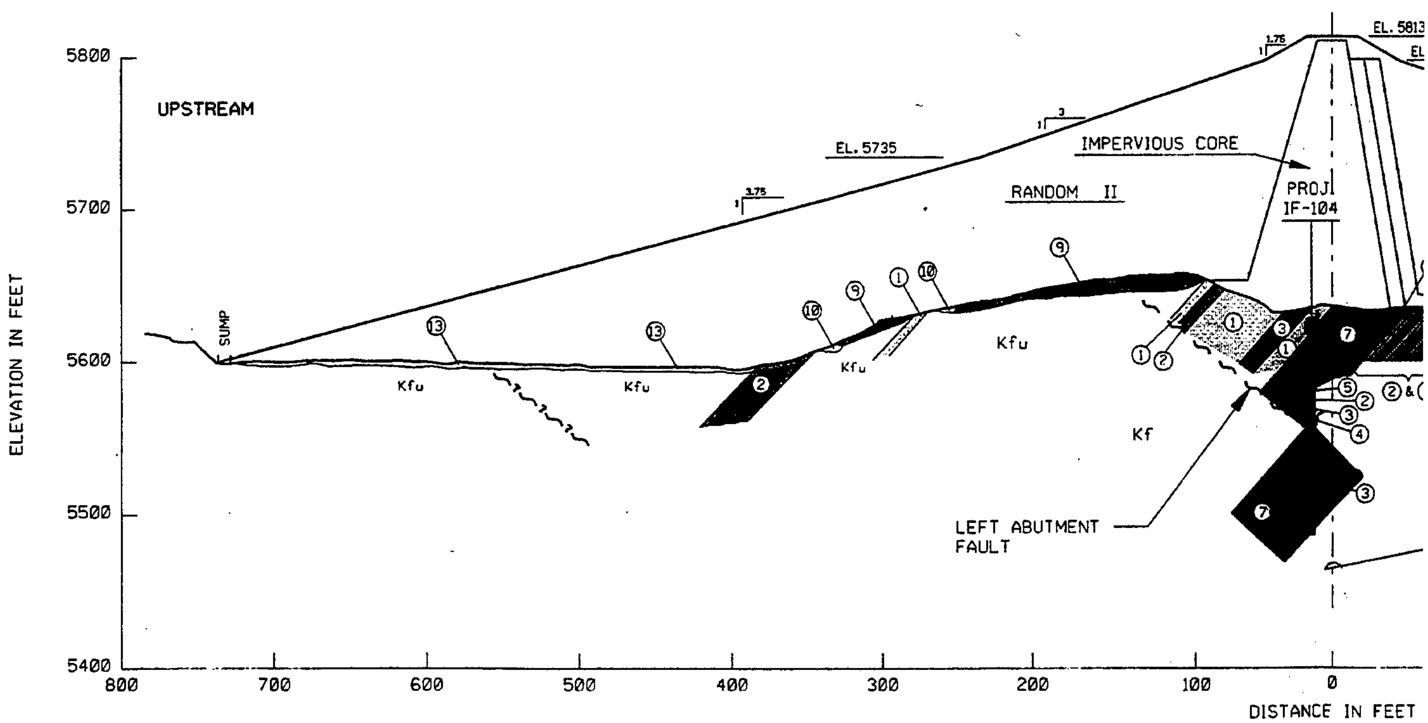
GEOLOGIC SECTION ALONG AXIS OF DAM
STA. 21+75 TO STA. 27+75

DEPARTMENT OF THE ARMY
SACRAMENTO DISTRICT, CORPS OF ENGINEERS
SACRAMENTO, CALIFORNIA

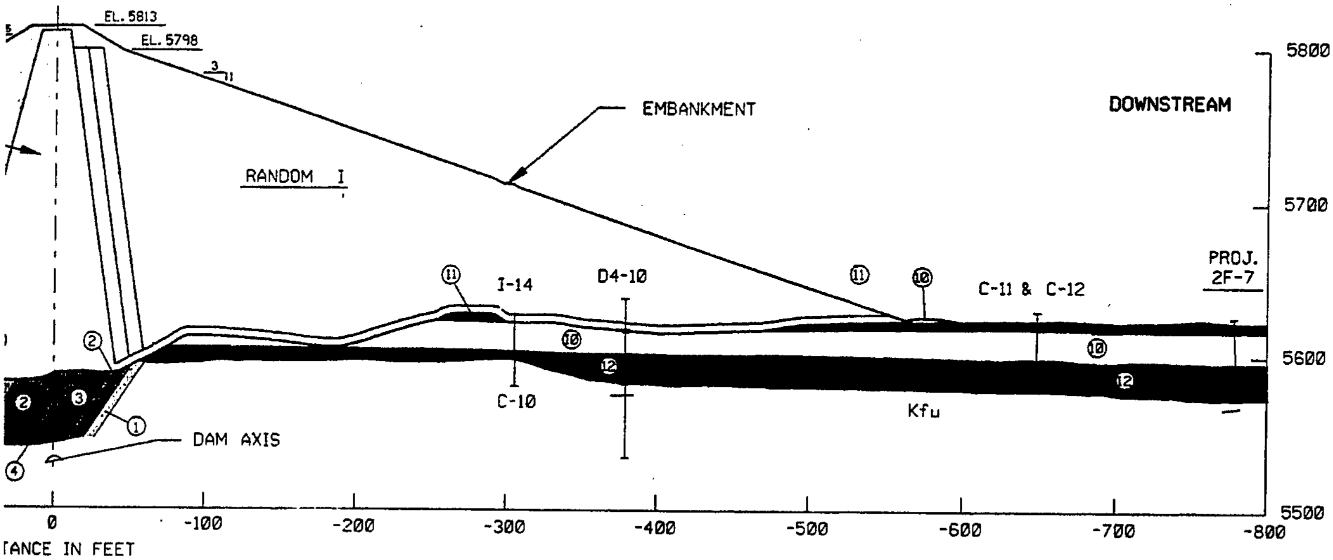
SUBMITTED:			APPROVED:
CARL E. COLE RESIDENT GEOLOGIST			[signature] RESIDENT ENGINEER
ERE		CEC	PLATE 16



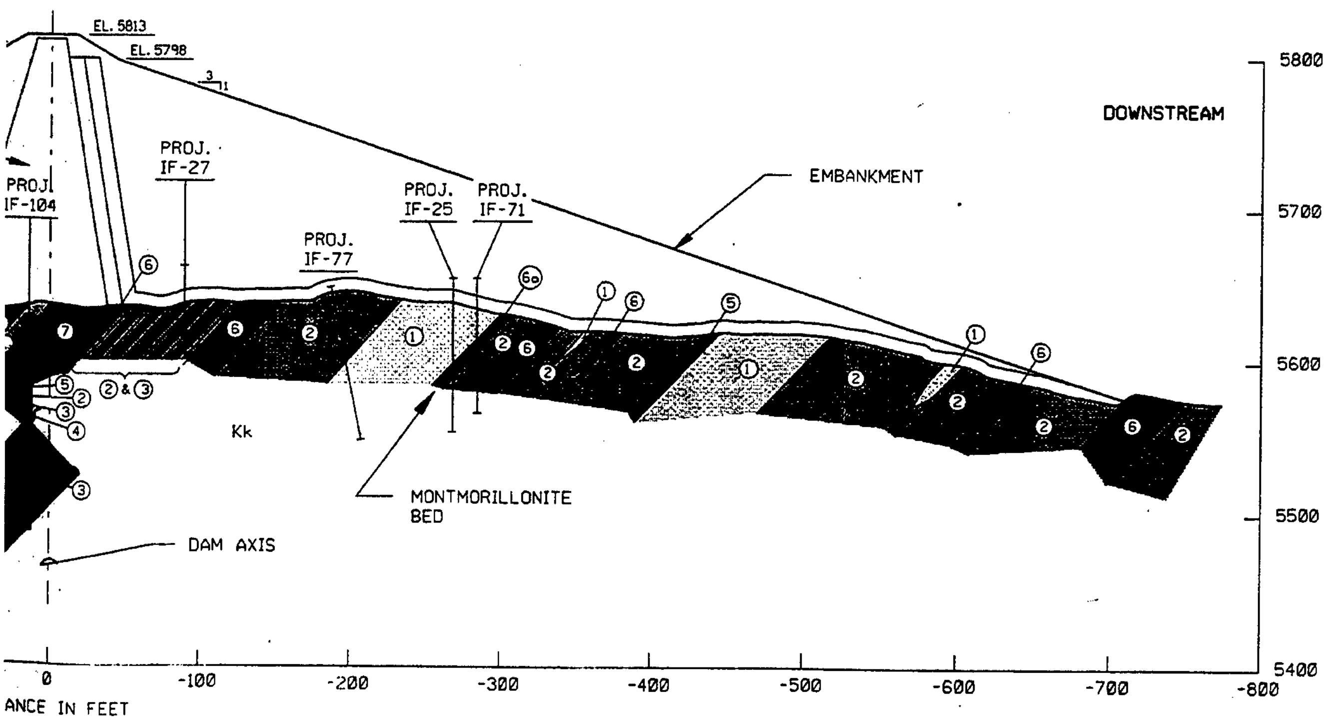
SECTION ALONG STA. 18



SECTION ALONG STA. 13



ALONG STA. 18+00



ALONG STA. 13+00

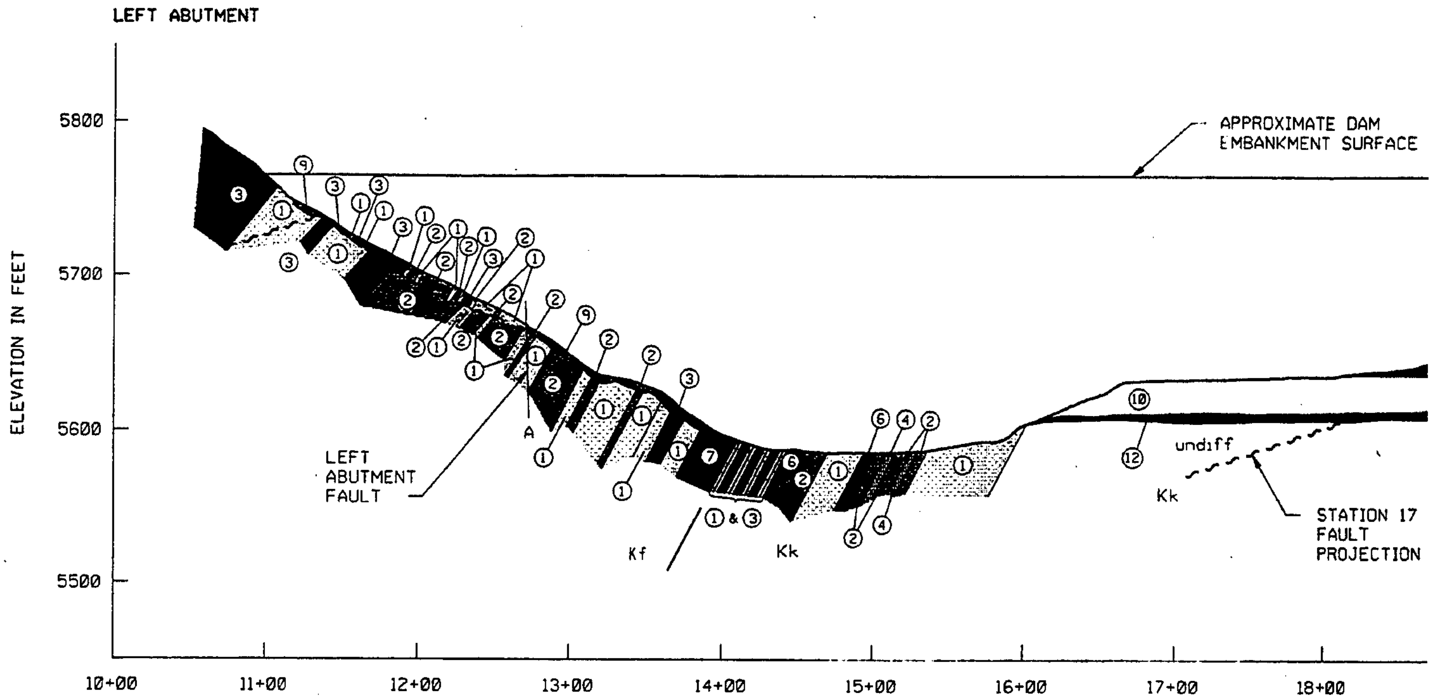
NOTE:
1. FOR GEOLOGIC MAP LEGEND AND SYMBOLS SEE PLATE 11.

GRAPHIC SCALE (FEET)

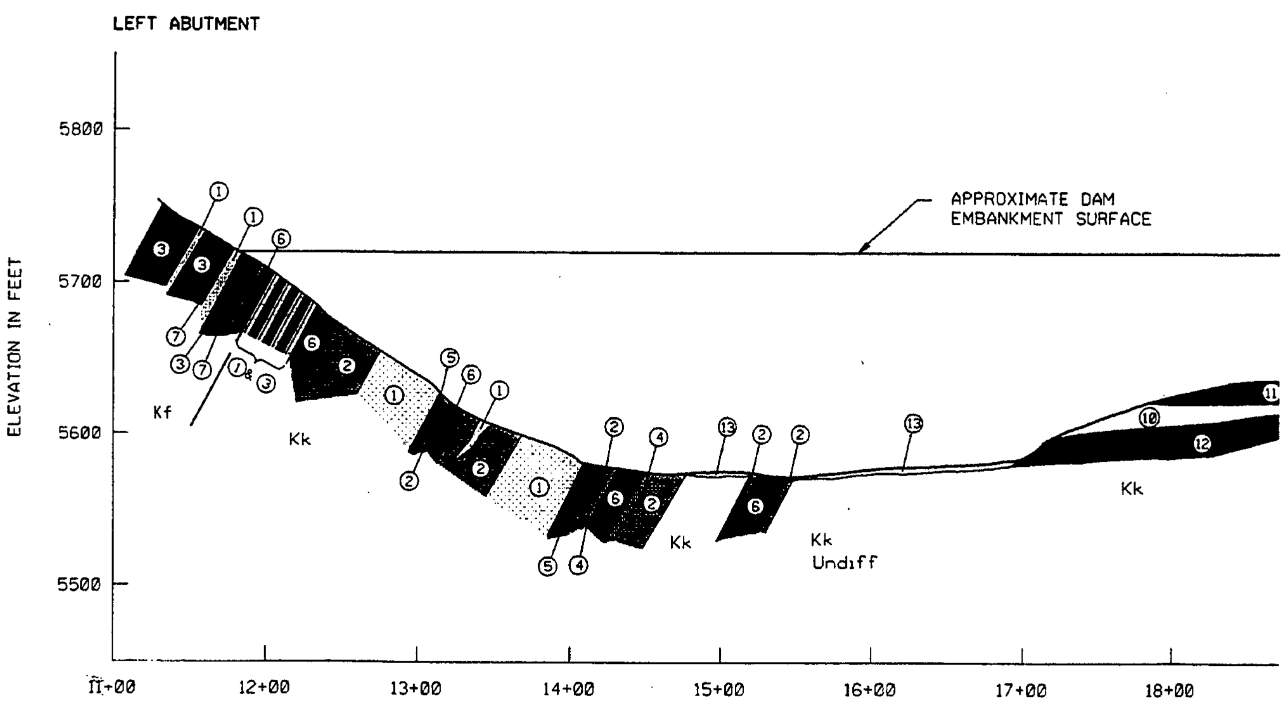
1" = 125'-0"   0   125'   250'

LITTLE DELL LAKE SALT LAKE CITY STREAMS, UTAH MAIN DAM GEOLOGIC SECTION PERPENDICULAR TO AXIS AT STA. 13+00 AND STA. 18+00	
DEPARTMENT OF THE ARMY SACRAMENTO DISTRICT, CORPS OF ENGINEERS SACRAMENTO, CALIFORNIA	
SUBMITTED: CARL E. COLE RESIDENT GEOLOGIST	APPROVED: RESIDENT ENGINEER
ERE / CEC	PLATE 17

2

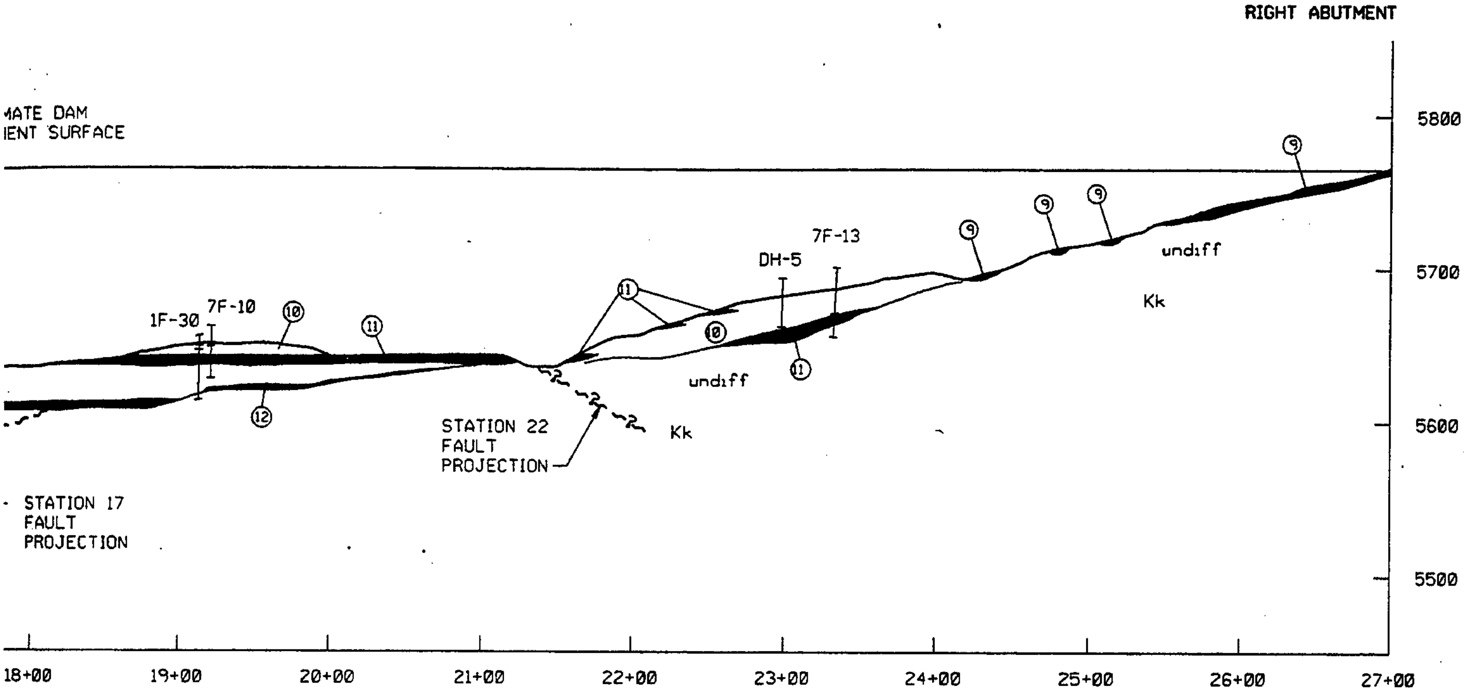


SECTION AT 150' U/S

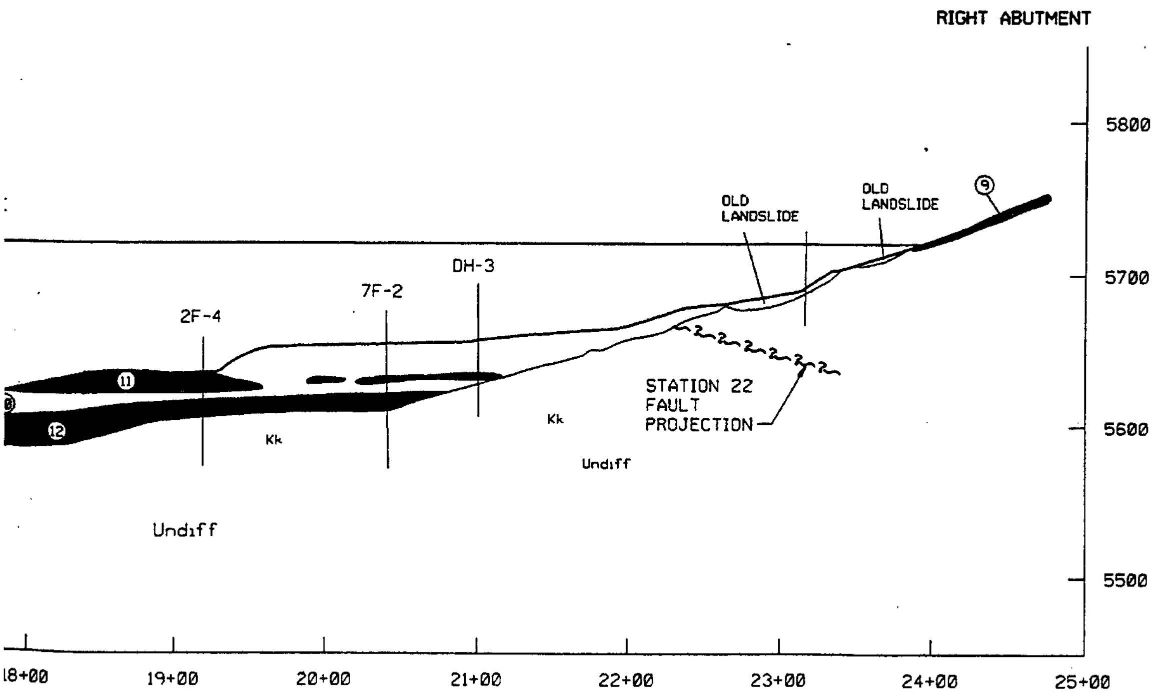


SECTION AT 275' D/S

0



I AT 150' U/S



AT 275' D/S

NOTE:
1. FOR GEOLOGIC MAP LEGEND AND SYMBOLS SEE PLATE 11.

GRAPHIC SCALE (FEET)

1" = 125'-0" 0 125' 250'

LITTLE DELL LAKE
SALT LAKE CITY STREAMS, UTAH

MAIN DAM

GEOLOGIC SECTIONS PARALLEL TO AXIS
AT 275' D/S AND AT 150' U/S

DEPARTMENT OF THE ARMY
SACRAMENTO DISTRICT, CORPS OF ENGINEERS
SACRAMENTO, CALIFORNIA

SUBMITTED: CARL E. COLE, RESIDENT GEOLOGIST

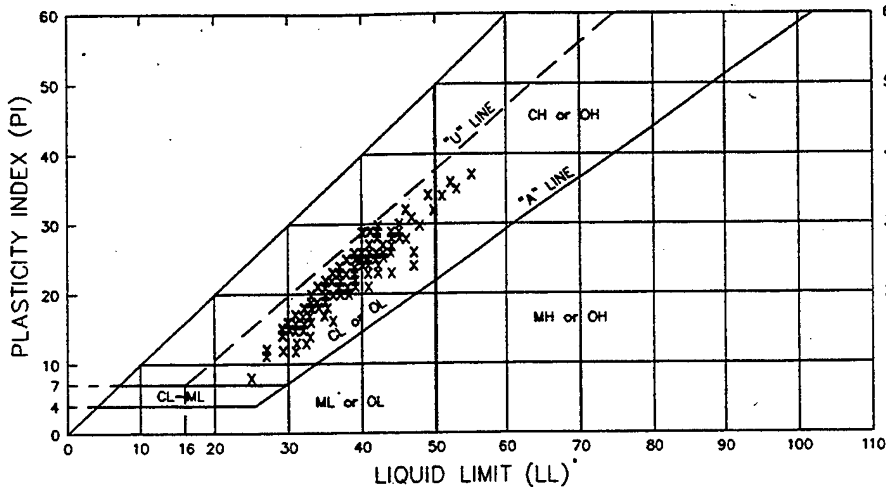
APPROVED: RESIDENT ENGINEER

ERE | CEC

PLATE 18

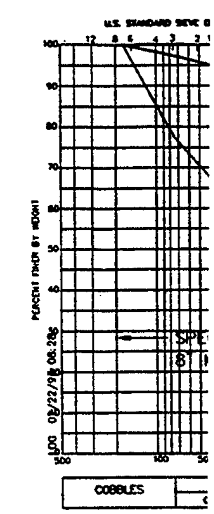
2

LITTLE DELL PROJECT: PL-19 24 MAY 94 NLB

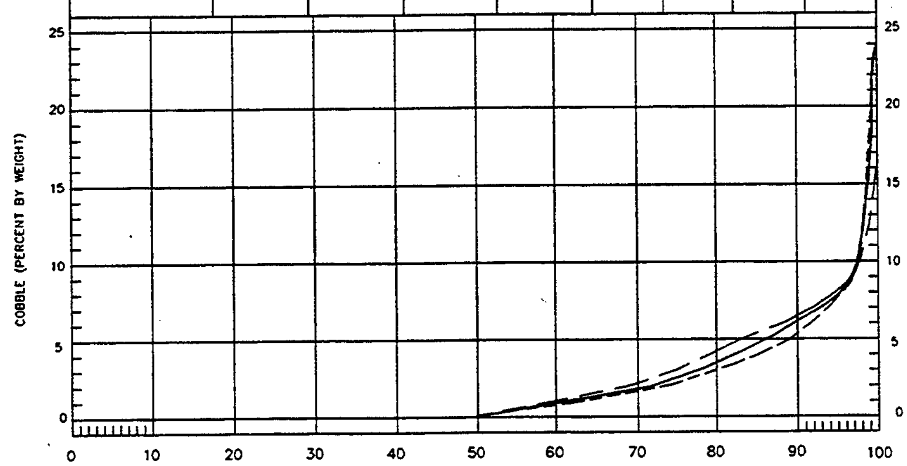


PLASTICITY CHART

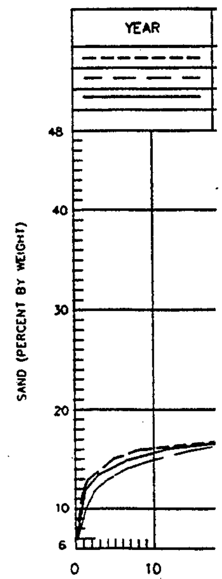
NOTE: X REPRESENTS ALL TEST DATA FOR 1991 AND 1992.



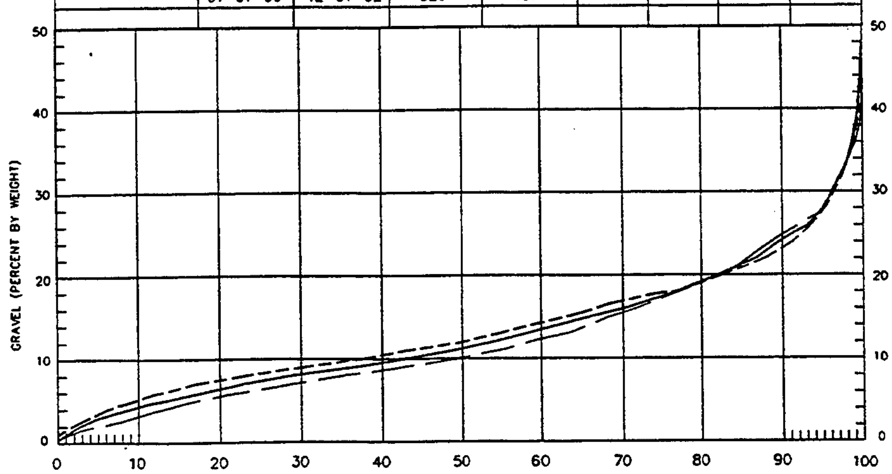
YEAR	FROM	TO	# TESTS	MEAN	STD DEV	≤ 10%	MEDIAN	≥ 90%
- - - - - - -	01-01-92	12-31-92	192	1.7	3.4	0	0	5
— — — —	01-01-91	12-31-91	132	2.0	3.1	0	0	6
———	01-01-90	12-31-92	325	1.8	3.3	0	0	6



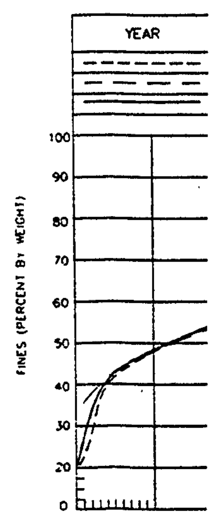
COBBLE – S-CURVE



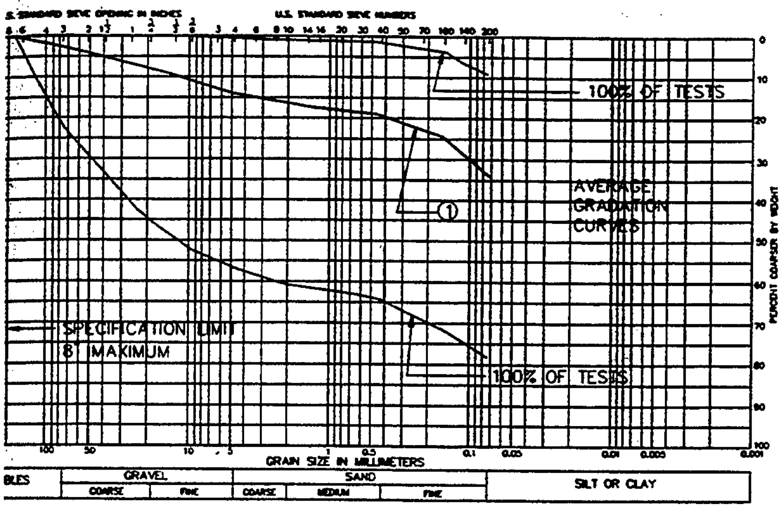
YEAR	FROM	TO	# TESTS	MEAN	STD DEV	≤ 10%	MEDIAN	≥ 90%
- - - - - - -	01-01-92	12-31-92	192	13.5	7.6	5	12	22
— — — —	01-01-91	12-31-91	132	12.6	8.2	3	10	25
———	01-01-90	12-31-92	325	13.1	7.8	5	11	24



GRAVEL – S-CURVE

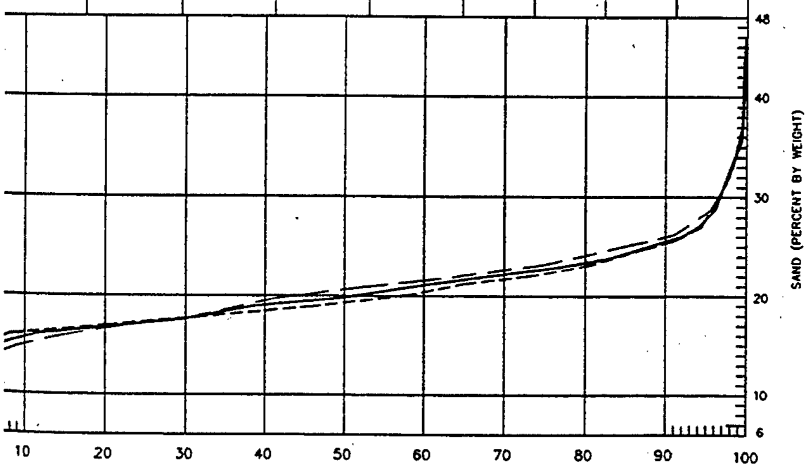


(1)



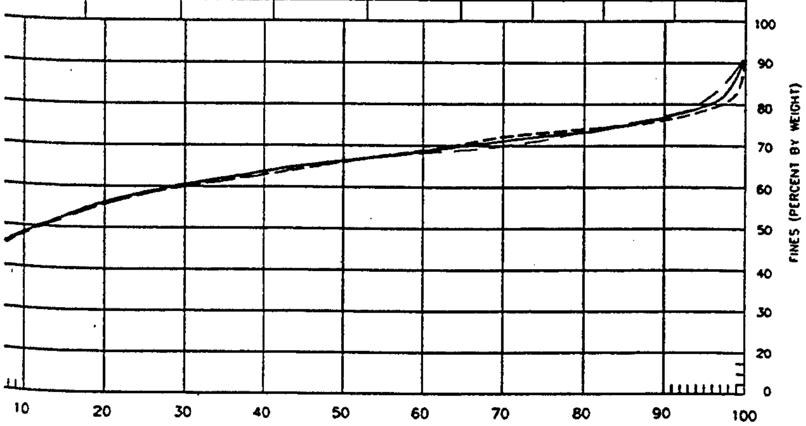
GRADATION CURVES

YEAR	FROM	TO	# TESTS	MEAN	STD DEV	≤ 10%	MEDIAN	≥ 90%
	01-01-92	12-31-92	192	20.3	4.5	16	20	25
	01-01-91	12-31-91	132	20.7	4.9	15	20	26
	01-01-90	12-31-92	325	20.5	4.6	16	20	25



SAND – S-CURVE

YEAR	FROM	TO	# TESTS	MEAN	STD DEV	≤ 10%	MEDIAN	≥ 90%
	01-01-92	12-31-92	192	64.4	11.7	49	66	77
	01-01-91	12-31-91	132	64.7	10.9	48	66	76.5
	01-01-90	12-31-92	325	64.6	11.4	49	66	77



FINES – S-CURVE

NOTES:

① AVG. GRADATION 1991 & 1992

NOTE: AVG. GRADATION IN 1991 & 1992 ARE PRACTICALLY THE SAME

LEGEND

- - - - - - -	1992
— — — —	1991
———	1990, 1991, & 1992
STD DEV	STANDARD DEVIATION

LITTLE DELL LAKE
SALT LAKE CITY STREAMS, UTAH

EMBANKMENT

RANDOM I – CLASSIFICATION TEST RESULTS

DEPARTMENT OF THE ARMY
SACRAMENTO DISTRICT, CORPS OF ENGINEERS
SACRAMENTO, CALIFORNIA

SUBMITTED: MICHAEL D. RAMSBOTHAM

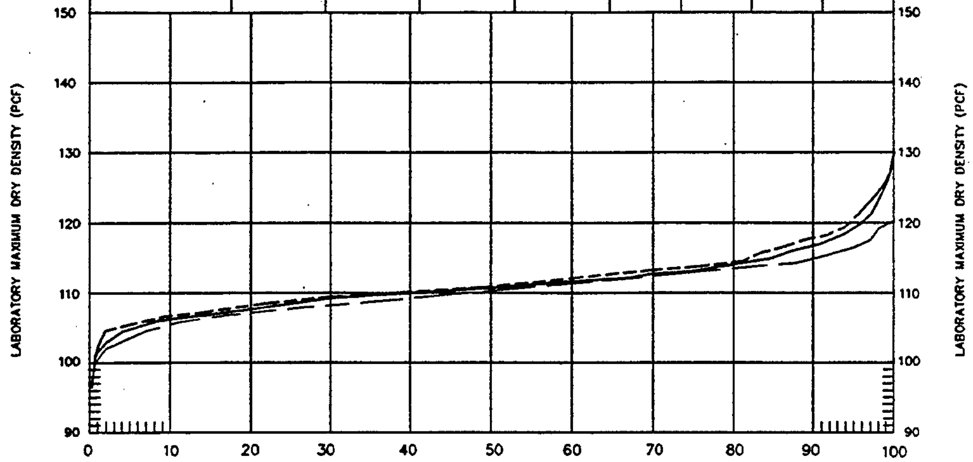
APPROVED: [signature] RESIDENT ENGINEER

DR. BY: GEB | CHECKED BY: MDR

PLATE 19

2

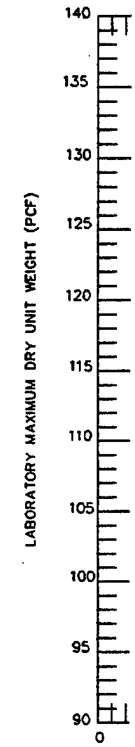
YEAR	FROM	TO	# TESTS	MEAN	STD DEV	≤ 10%	MEDIAN	≥ 90%
- - - - - - - -	01-01-92	12-31-92	191	111.6	4.7	106.5	110.8	117.6
— — — —	01-01-91	12-31-91	119	110.3	3.9	105.2	110.2	115.2
————	01-01-90	12-31-92	311	111.1	4.4	106.2	110.6	116.4



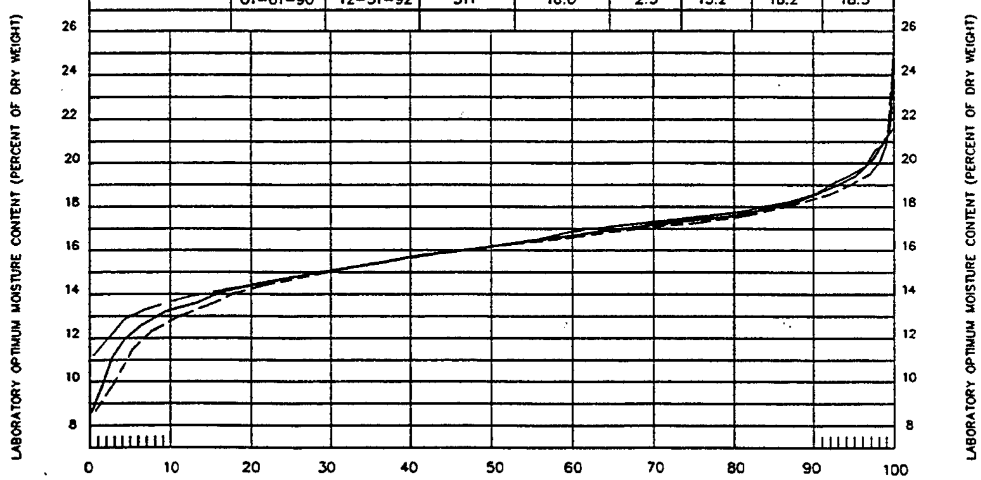
PERCENT OF TESTS WITH LOWER WEIGHT THAN SHOWN

LABORATORY MAXIMUM DRY DENSITY – S-CURVE

NOTE:
1. REFERENCE EM 1110-2-1906 AND ASTM D 698 STANDARD EFFORT



YEAR	FROM	TO	# TESTS	MEAN	STD DEV	≤ 10%	MEDIAN	≥ 90%
- - - - - - - -	01-01-92	12-31-92	191	15.9	2.4	12.7	16.2	18.4
— — — —	01-01-91	12-31-91	119	16.2	2.0	13.6	16.1	18.7
————	01-01-90	12-31-92	311	16.0	2.3	13.2	16.2	18.5

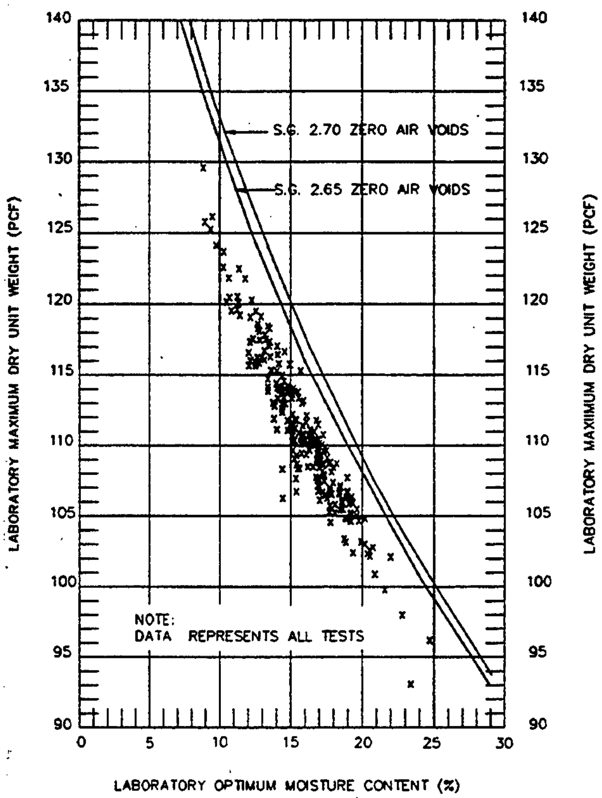


PERCENT OF TESTS WITH LOWER MOISTURE THAN SHOWN

LABORATORY OPTIMUM MOISTURE CONTENT – S-CURVE

NOTE:
1. REFERENCE EM 1110-2-1906 AND ASTM D 698, STANDARD EFFORT

LITTLE DELL PROJECT: PL-20 24 MAY 94 NLB



OPTIMUM MOISTURE VS. MAXIMUM DRY DENSITY

NOTE:
AVERAGE SPECIFIC GRAVITY = 2.6

LEGEND

- - - - - - -	1992
— — — —	1991
————	1990, 1991, & 1992

SG	= SPECIFIC GRAVITY
PCF	= POUNDS PER CUBIC FOOT
STD DEV	= STANDARD DEVIATION

LITTLE DELL LAKE
SALT LAKE CITY STREAMS, UTAH

EMBANKMENT

RANDOM I – COMPACTION TEST RESULTS

DEPARTMENT OF THE ARMY
SACRAMENTO DISTRICT, CORPS OF ENGINEERS
SACRAMENTO, CALIFORNIA

SUBMITTED:

MICHAEL D. RAMSBOTHAM

APPROVED:

RESIDENT ENGINEER

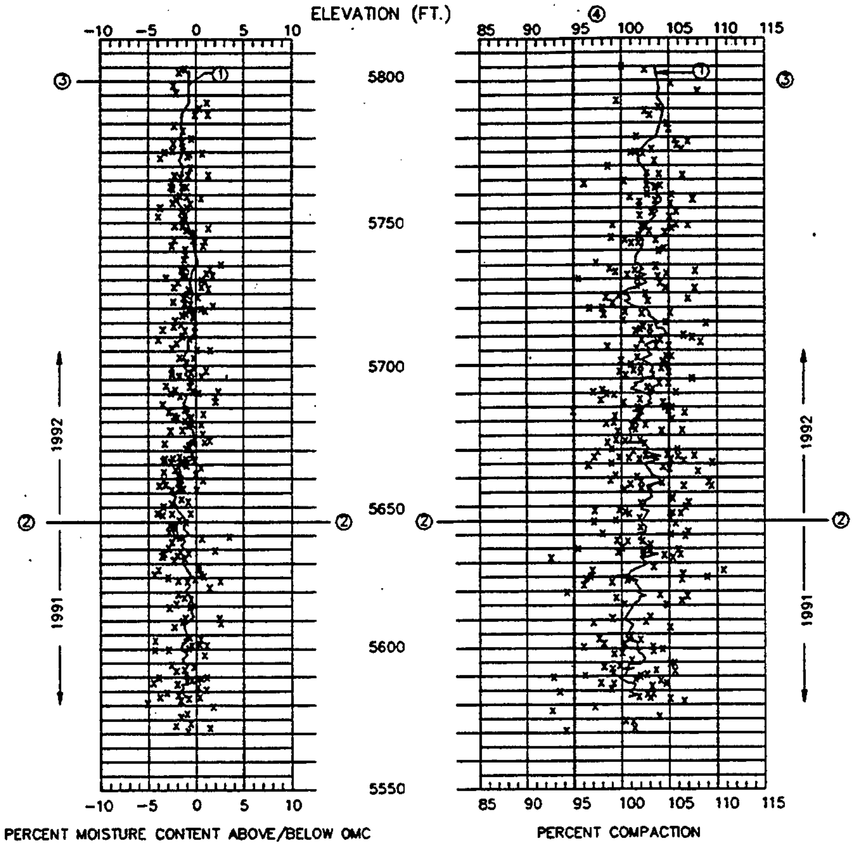
DR. BY: GEB

CKD BY: MDR

PLATE 20

2

LITTLE DELL PROJECT: PL-21 24 MAY 94 NLB



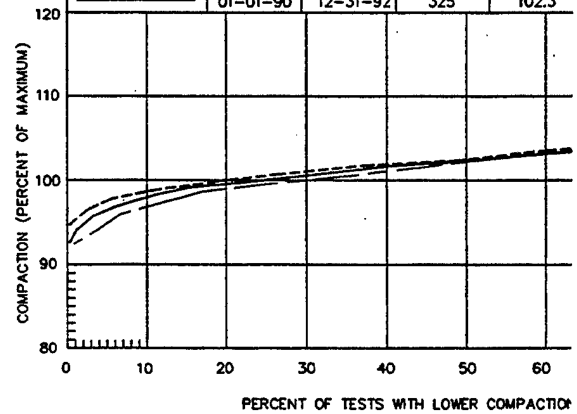
NOTES:

① CURVE REPRESENTS A RUNNING AVERAGE OF 10 TESTS

② APPROXIMATE ELEVATION OF THE RANDOM I SHELL AT THE END OF THE 1991 CONSTRUCTION SEASON

③ RANDOM II TYPE MATERIAL PLACED ABOVE ELEVATION 5798 FT.

④ 95% – DESIRED MINIMUM; 99% – DESIRED AVERAGE



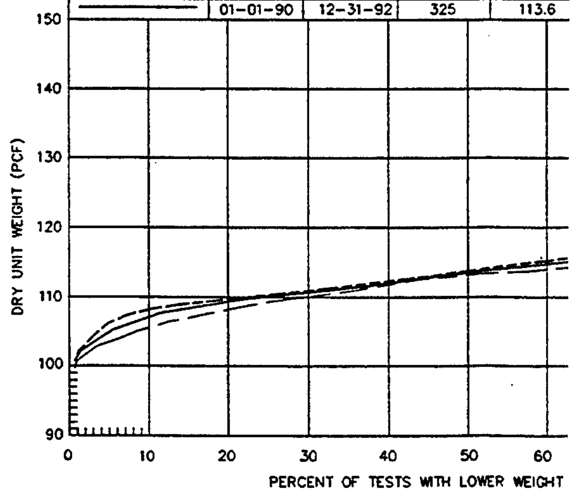
YEAR	FROM	TO	# TESTS	MEAN
----------	01-01-92	12-31-92	192	102.5
— — — —	01-01-91	12-31-91	132	102.0
————	01-01-90	12-31-92	325	102.3

IN PLACE COMPACTION – S

NOTES:

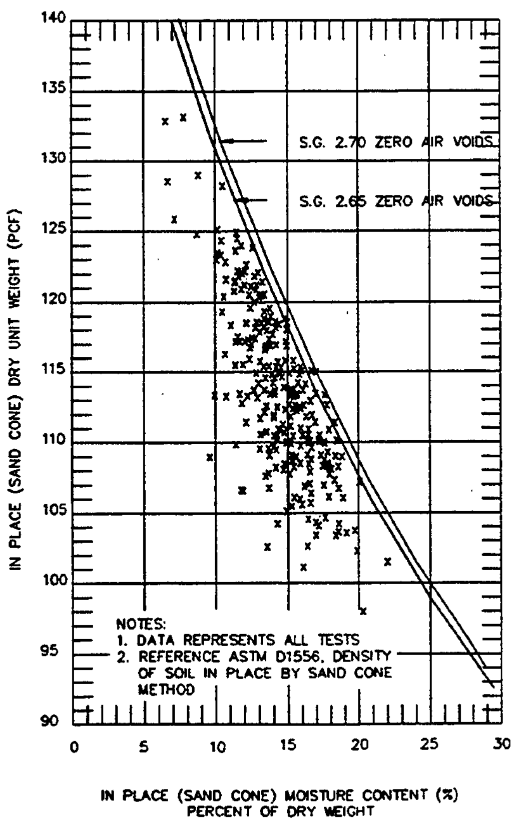
① REFE STAI

② REFE IN P



YEAR	FROM	TO	# TESTS	MEAN
----------	01-01-92	12-31-92	192	114.3
— — — —	01-01-91	12-31-91	132	112.5
————	01-01-90	12-31-92	325	113.6

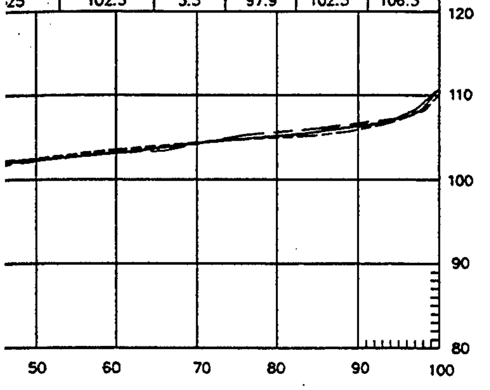
IN PLACE UNIT WEIGHT – S



MOISTURE VS. DENSITY

1

ESTS	MEAN	STD DEV	≤ 10%	MEDIAN	≥ 90%
92	102.5	2.9	98.4	102.3	105.9
32	102.0	3.8	96.9	102.0	106.4
25	102.3	3.3	97.9	102.3	106.3



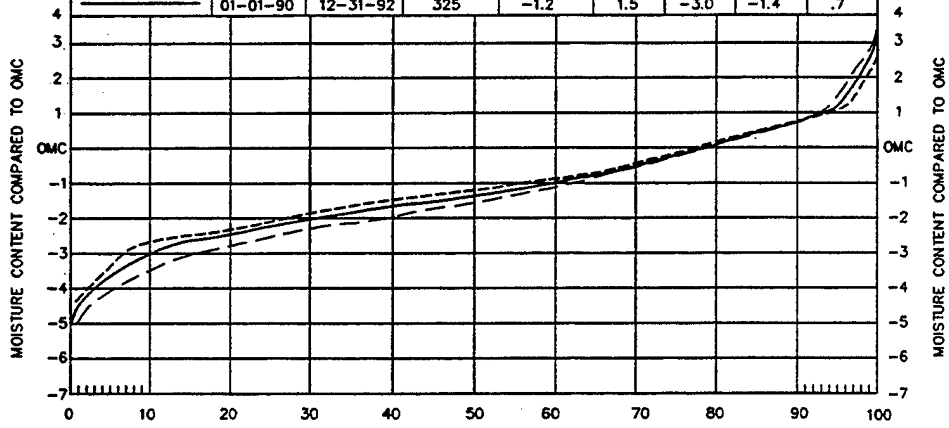
'ACTION – S-CURVE

NOTES:

① REFERENCE EM 1110-2-1906 AND ASTM D698, STANDARD EFFORT

② REFERENCE ASTM D 1556, DENSITY OF SOIL IN PLACE BY SAND CONE METHOD

YEAR	FROM	TO	# TESTS	MEAN	STD DEV	≤ 10%	MEDIAN	≥ 90%
----------	01-01-92	12-31-92	192	-1.1	1.6	-2.7	-1.3	.7
— — — — —	01-01-91	12-31-91	132	-1.4	1.6	-3.6	-1.6	.6
————	01-01-90	12-31-92	325	-1.2	1.5	-3.0	-1.4	.7



OMC COMPARISON – S-CURVES

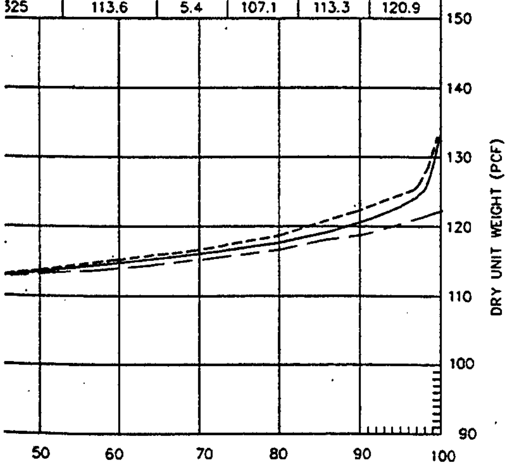
NOTES:

① REFERENCE EM 1110-2-1906 AND ASTM D698, STANDARD EFFORT

② MOISTURE CONTENT WAS DETERMINED AS PERCENT OF DRY WEIGHT

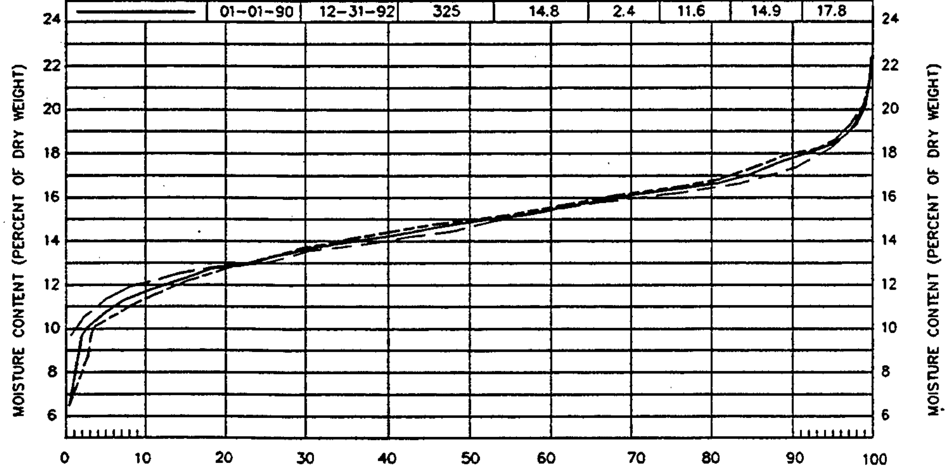
③ OMC = OPTIMUM MOISTURE CONTENT

TESTS	MEAN	STD DEV	≤ 10%	MEDIAN	≥ 90%
192	114.3	5.7	108.1	113.6	121.9
132	112.5	4.8	105.5	113.2	118.3
325	113.6	5.4	107.1	113.3	120.9



' WEIGHT – S-CURVE

YEAR	FROM	TO	# TESTS	MEAN	STD DEV	≤ 10%	MEDIAN	≥ 90%
----------	01-01-92	12-31-92	192	14.8	2.6	11.4	15.0	17.9
— — — — —	01-01-91	12-31-91	132	14.8	2.2	12.1	14.5	17.3
————	01-01-90	12-31-92	325	14.8	2.4	11.6	14.9	17.8



IN PLACE MOISTURE CONTENT – S-CURVE

LEGEND

---------- 1992
— — — — — 1991
———— 1990, 1991, & 1992

PCF = POUNDS PER CUBIC FOOT
OMC = OPTIMUM MOISTURE CONTENT
SG = SPECIFIC GRAVITY
STD DEV = STANDARD DEVIATION

LITTLE DELL LAKE
SALT LAKE CITY STREAMS, UTAH

EMBANKMENT

RANDOM I – CONSTRUCTION PLACEMENT DATA

DEPARTMENT OF THE ARMY
SACRAMENTO DISTRICT, CORPS OF ENGINEERS
SACRAMENTO, CALIFORNIA

SUBMITTED: MICHAEL D. RAMSBOTHAM

APPROVED: RESIDENT ENGINEER

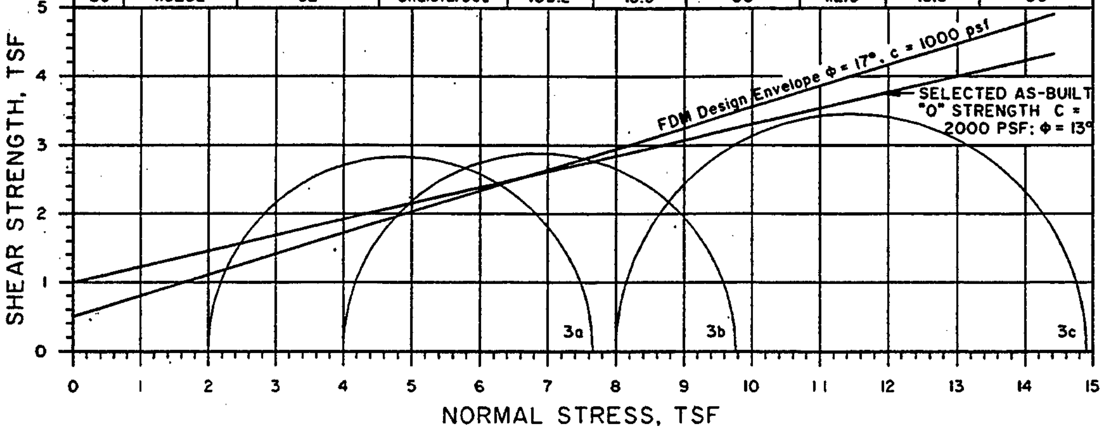
DR. BY: GEB

CHECKED BY: MDR

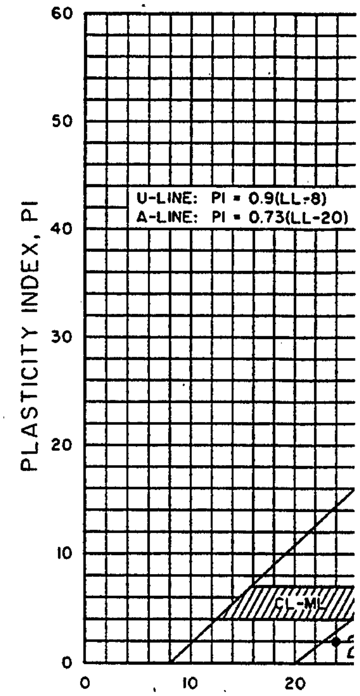
PLATE 21

2

NO.	DIVISION SAMPLE NO.	MATERIAL CLASS. SYMBOL	TYPE OF SAMPLE	PROPERTIES: INITIAL: DRY DENSITY (PCF)	PROPERTIES: INITIAL: MOISTURE CONTENT (%)	PROPERTIES: INITIAL: SATURATION (%)	PROPERTIES: BEFORE SHEAR: DRY DENSITY (PCF)	PROPERTIES: BEFORE SHEAR: MOISTURE CONTENT (%)	PROPERTIES: BEFORE SHEAR: SATURATION (%)
3a	118230	CL	Undisturbed	109.3	15.1	78	110.4	15.1	80
3b	118231	CL	Undisturbed	107.8	15.7	78	110.2	15.7	83
3c	118232	CL	Undisturbed	109.2	15.5	80	112.0	15.5	86

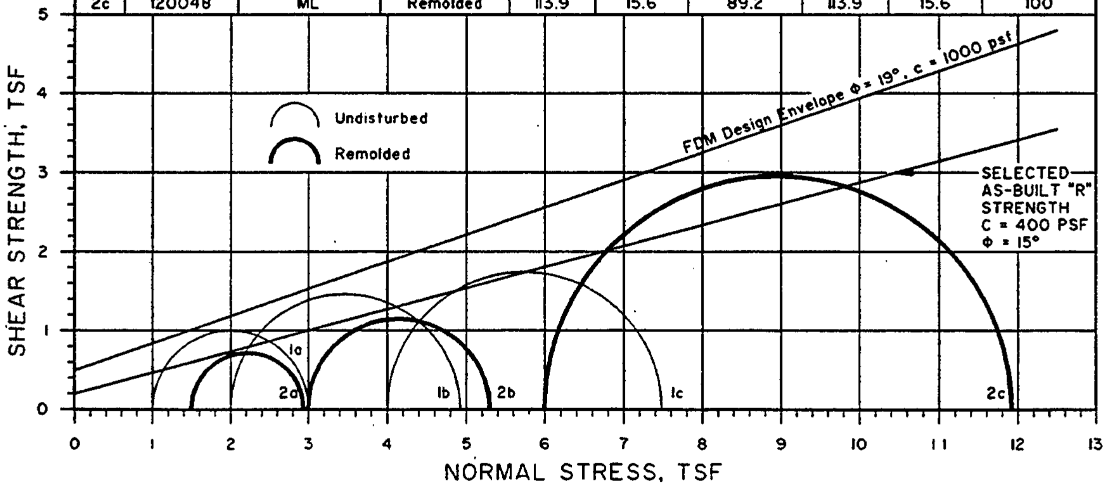


"Q" TRIAXIAL SHEAR STRENGTH (RANDOM I)

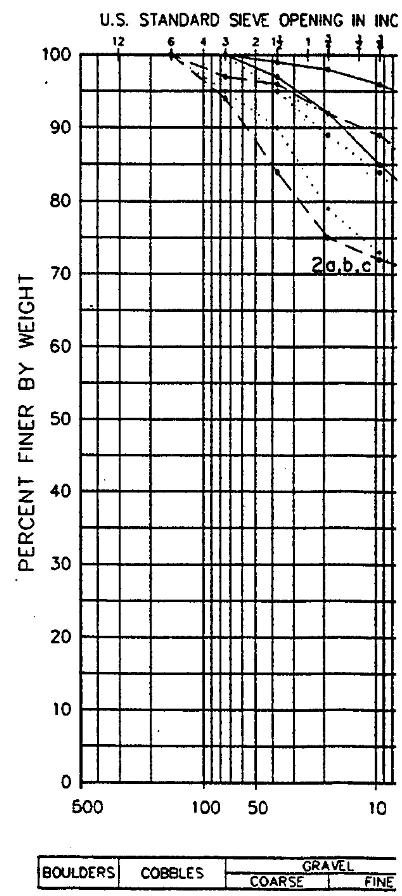


A

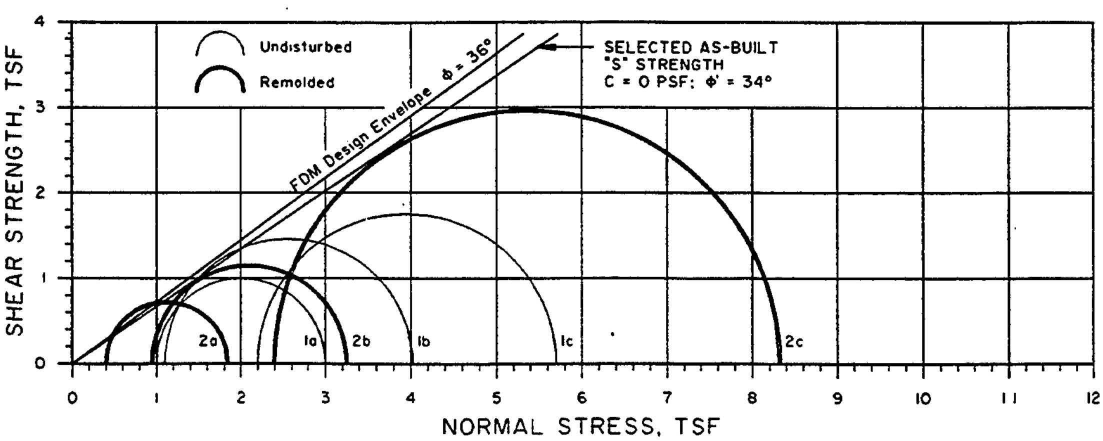
NO.	DIVISION SAMPLE NO.	MATERIAL CLASS. SYMBOL	TYPE OF SAMPLE	PROPERTIES: INITIAL: DRY DENSITY (PCF)	PROPERTIES: INITIAL: MOISTURE CONTENT (%)	PROPERTIES: INITIAL: SATURATION (%)	PROPERTIES: BEFORE SHEAR: DRY DENSITY (PCF)	PROPERTIES: BEFORE SHEAR: MOISTURE CONTENT (%)	PROPERTIES: BEFORE SHEAR: SATURATION (%)
1a	117941	GC	Undisturbed	113.5	12.9	75	115.5	15.6	96
1b	117943	CL	Undisturbed	106.3	15.6	74	108.0	19.7	98
1c	117944	CL	Undisturbed	106.3	16.7	80	111.2	19.7	98
2a	120048	ML	Remolded	107.7	15.8	76.5	110.7	19.1	100
2b	120048	ML	Remolded	107.9	15.8	76.9	107.9	18.2	100
2c	120048	ML	Remolded	113.9	15.6	89.2	113.9	15.6	100



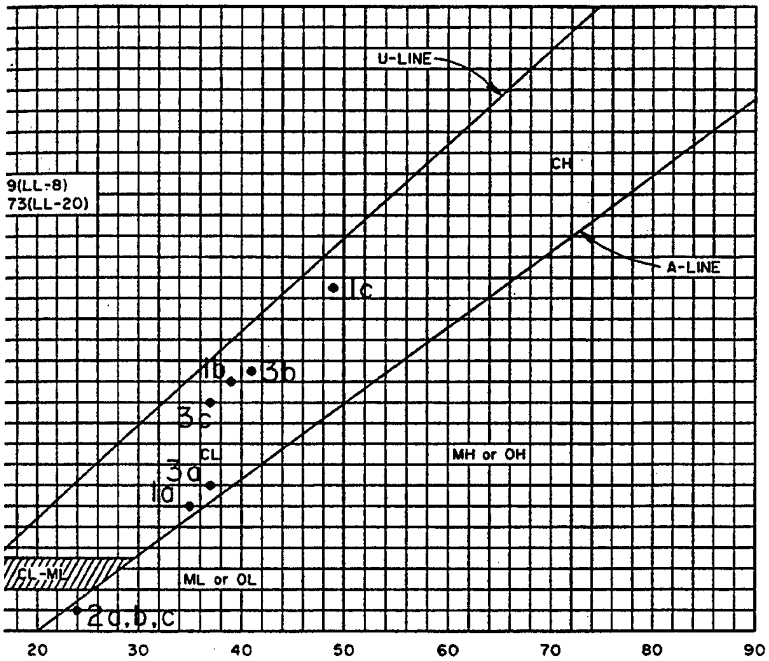
"R̄" TRIAXIAL SHEAR STRENGTH (RANDOM I)



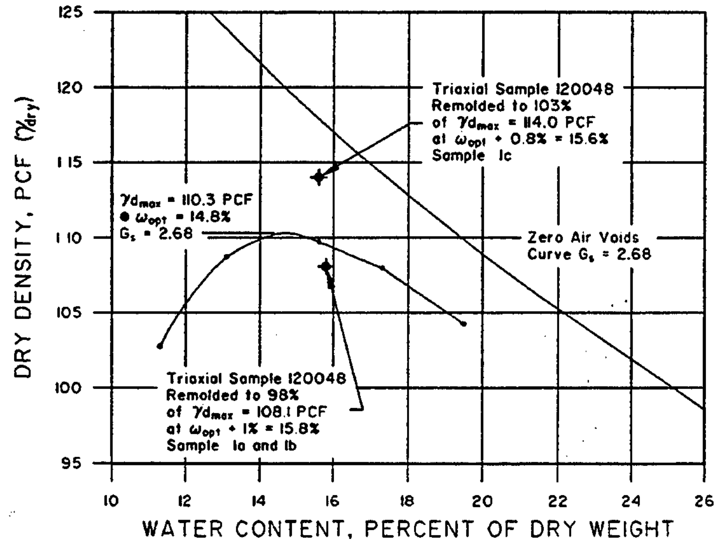
GRA



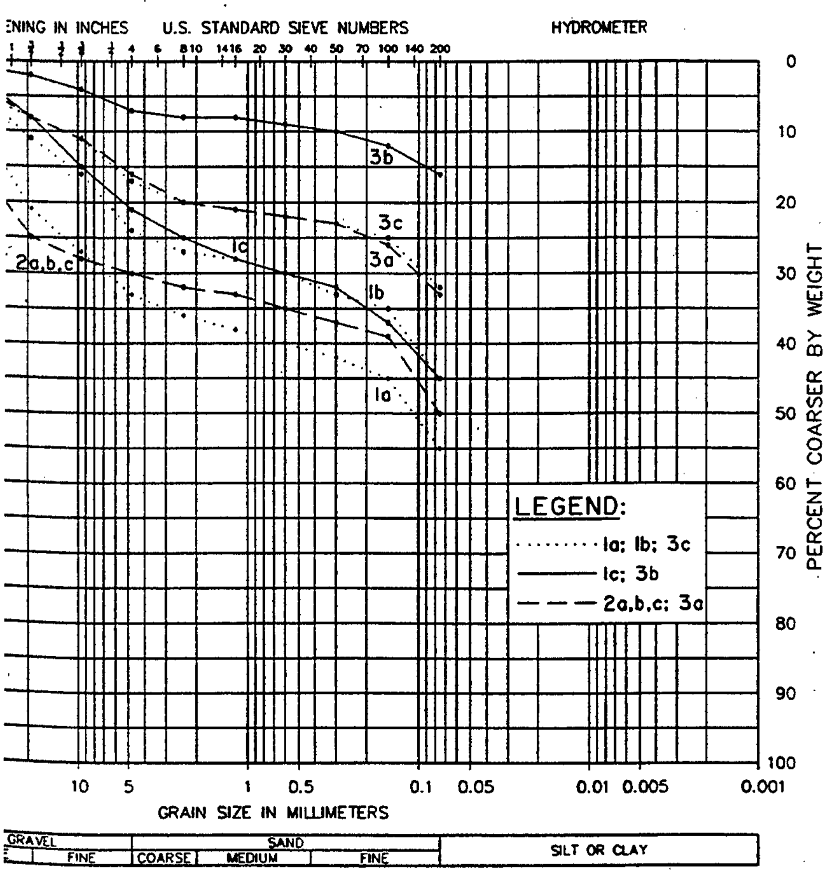
"S" TRIAXIAL SHEAR STRENGTH (RANDOM I)



ATTERBERG LIMITS (RANDOM I)



STANDARD COMPACTION TEST
(RANDOM I)



GRADATION CURVES (RANDOM I)

RECORD SAMPLING DATA
(RANDOM I)

DIVISION SAMPLE NO.	DATE OF SAMPLE	LOCATION		
		STATION	ELEVATION (Feet)	OFFSET
117941	10-13 Aug 91	15+07	5625.0	305' d/s
117943	10-13 Aug 91	15+07	5625.0	305' d/s
117944	10-13 Aug 91	15+07	5625.0	305' d/s
118230	30 Oct - 3 Nov 91	17+50	5668.8	135' d/s
118231	30 Oct - 3 Nov 91	17+50	5668.8	135' d/s
118232	30 Oct - 3 Nov 91	17+50	5668.8	135' d/s
120048	15-22 Jun 92	Various	5780.0	Varies d/s
120048	15-22 Jun 92	Various	5780.0	Varies d/s
120048	15-22 Jun 92	Various	5780.0	Varies d/s

LITTLE DELL LAKE
SALT LAKE CITY STREAMS, UTAH

RANDOM I FILL
RECORD TEST RESULTS

DEPARTMENT OF THE ARMY
SACRAMENTO DISTRICT, CORPS OF ENGINEERS
SACRAMENTO, CALIFORNIA

SUBMITTED: DAVE RICKETTS

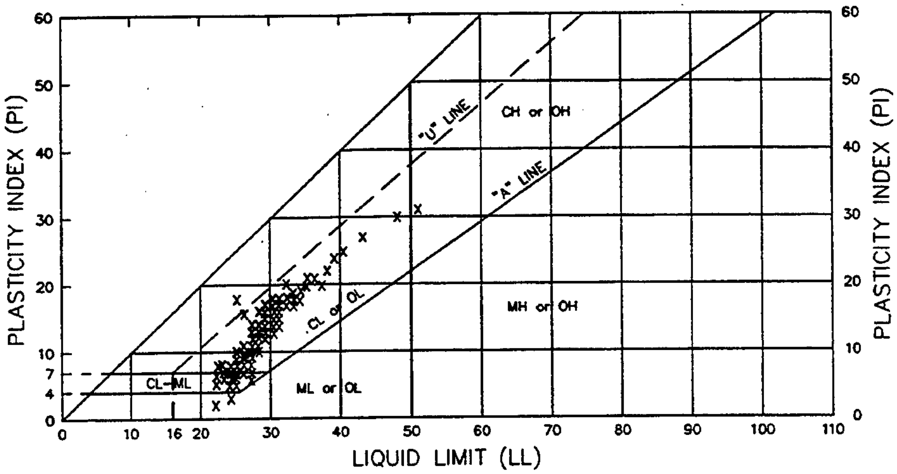
SUBMITTED: RESIDENT ENGINEER

DRAWN BY: N. BOLAND

CHECKED BY: D. R.

PLATE 22

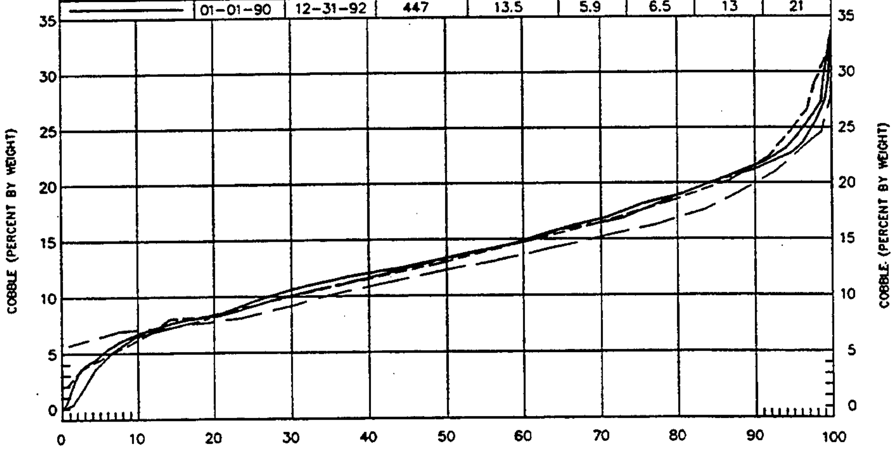
2



PLASTICITY CHART

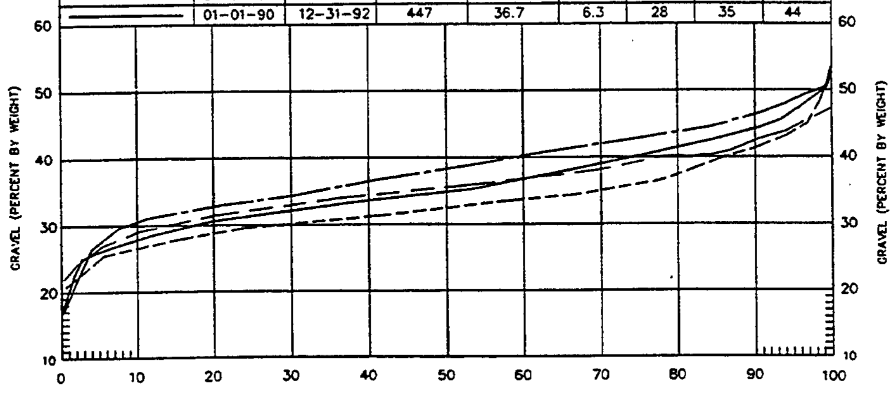
NOTE: X REPRESENTS ALL TEST DATA FOR 1991 AND 1992.

YEAR	FROM	TO	# TESTS	MEAN	STD DEV	≤ 10%	MEDIAN	≥ 90%
	01-01-92	12-31-92	165	12.6	6.2	6	13	21
	01-01-91	12-31-91	61	12.9	4.9	7	12	20
	01-01-90	12-31-90	201	13.6	5.9	6.5	13	21
	01-01-90	12-31-92	447	13.5	5.9	6.5	13	21

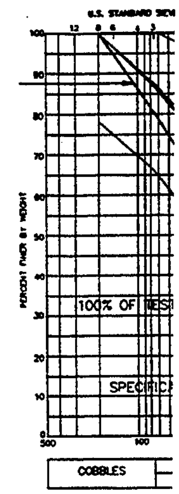


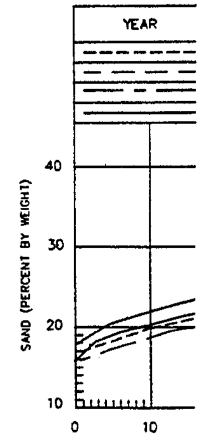
COBBLE - S-CURVE

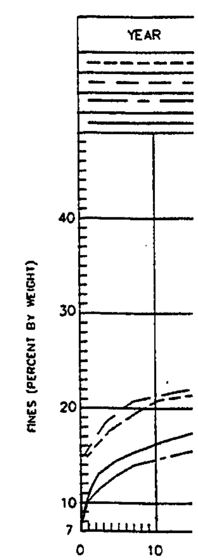
YEAR	FROM	TO	# TESTS	MEAN	STD DEV	≤ 10%	MEDIAN	≥ 90%
	01-01-92	12-31-92	165	33.3	5.6	26	33	41
	01-01-91	12-31-91	61	35.5	5.0	29	35	41
	01-01-90	12-31-90	201	38.0	6.5	31	38	46
	01-01-90	12-31-92	447	36.7	6.3	28	35	44



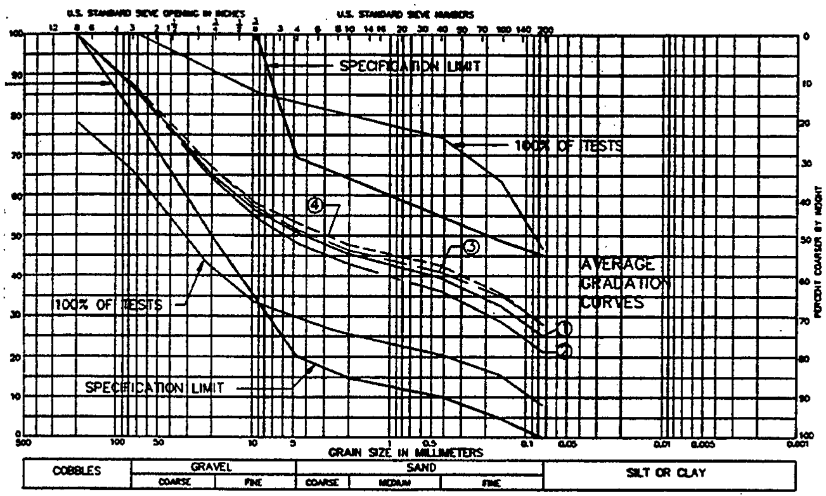
GRAVEL - S-CURVE





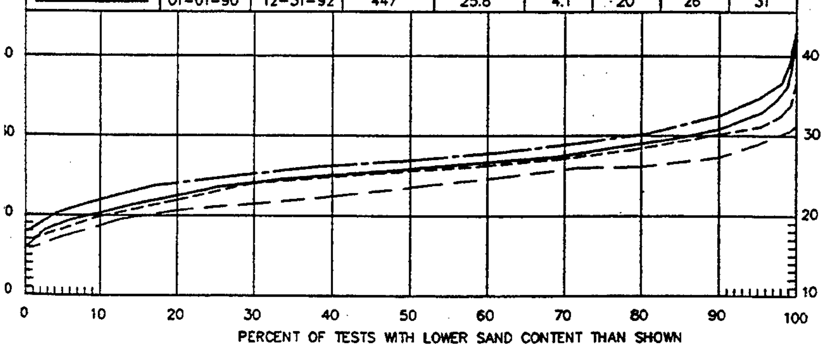


LITTLE DELL PROJECT: PL-23 24 MAY 94 NLB



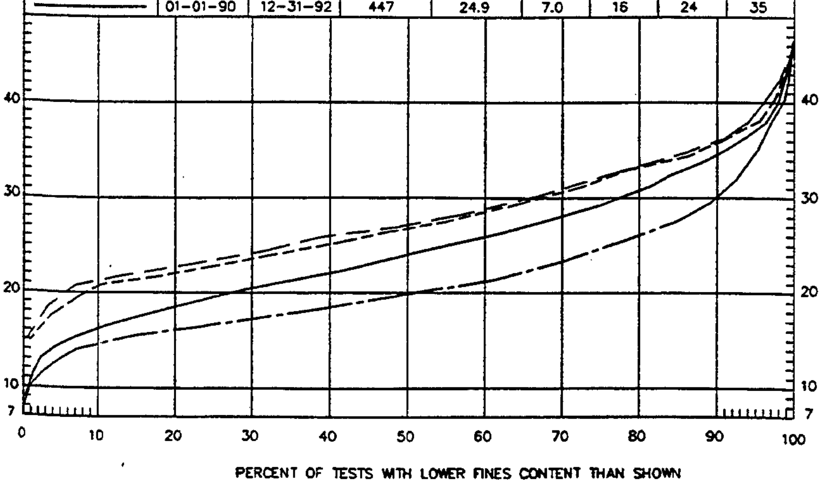
GRADATION CURVES

YEAR	FROM	TO	# TESTS	MEAN	STD DEV	≤ 10%	MEDIAN	≥ 90%
	01-01-92	12-31-92	185	25.4	3.7	20	25	30
	01-01-91	12-31-91	61	23.3	3.4	19	23	27
	01-01-90	12-31-90	201	27.0	4.1	22	27	32
	01-01-90	12-31-92	447	25.8	4.1	20	26	31



SAND – S-CURVE

YEAR	FROM	TO	# TESTS	MEAN	STD DEV	≤ 10%	MEDIAN	≥ 90%
	01-01-92	12-31-92	165	27.7	6.0	21	27	36
	01-01-91	12-31-91	61	28.2	5.9	22	27	35
	01-01-90	12-31-90	201	21.4	6.6	15	20	30
	01-01-90	12-31-92	447	24.9	7.0	16	24	35



FINES – S-CURVE

LEGEND

④ 1992
③ 1991
② 1990
① 1990, 1991, & 1992
STD DEV STANDARD DEVIATION

LITTLE DELL LAKE
SALT LAKE CITY STREAMS, UTAH

EMBANKMENT

RANDOM II – CLASSIFICATION TEST RESULTS

DEPARTMENT OF THE ARMY
SACRAMENTO DISTRICT, CORPS OF ENGINEERS
SACRAMENTO, CALIFORNIA

SUBMITTED: MICHAEL D. RAMSBOTHAM

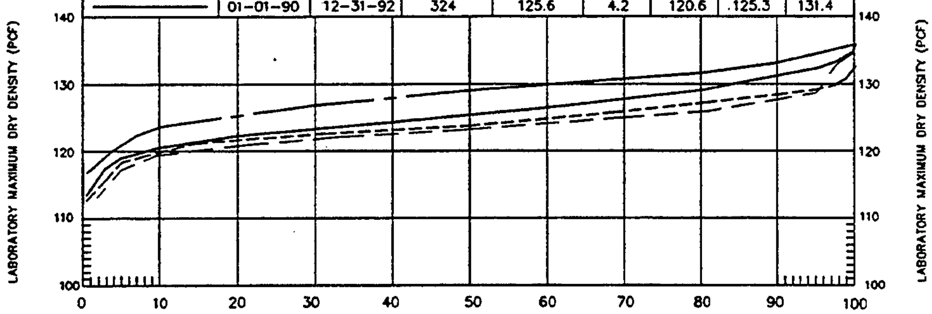
APPROVED: RESIDENT ENGINEER

DR. BY: GEB | CHECKED BY: MDR

PLATE 23

(2)

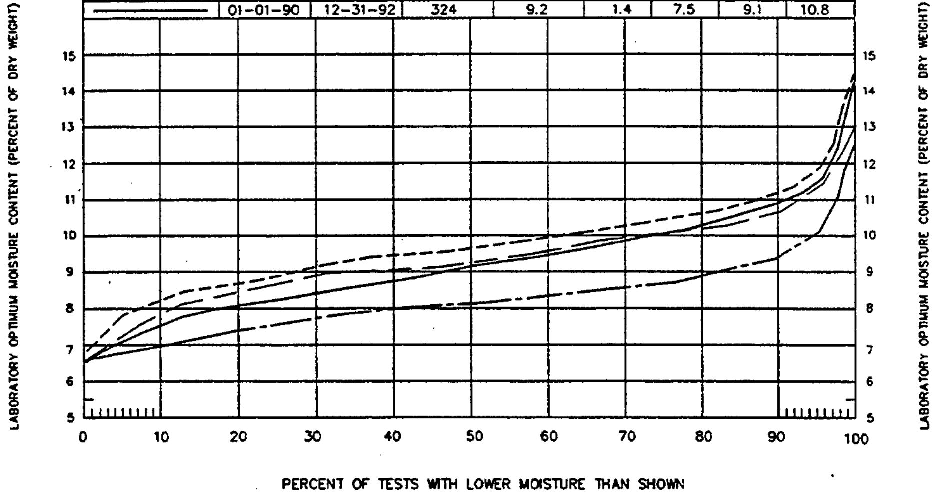
YEAR	FROM	TO	# TESTS	MEAN	STD DEV	≤ 10%	MEDIAN	≥ 90%
- - - - - - - -	01-01-92	12-31-92	179	124.1	3.4	119.9	124.0	128.3
— — — —	01-01-91	12-31-91	35	123.7	3.6	119.6	123.3	127.4
—— - ——	01-01-90	12-31-90	110	128.6	3.8	123.8	129.1	133.3
————	01-01-90	12-31-92	324	125.6	4.2	120.6	.125.3	131.4



LABORATORY MAXIMUM DRY DENSITY – S-CURVE

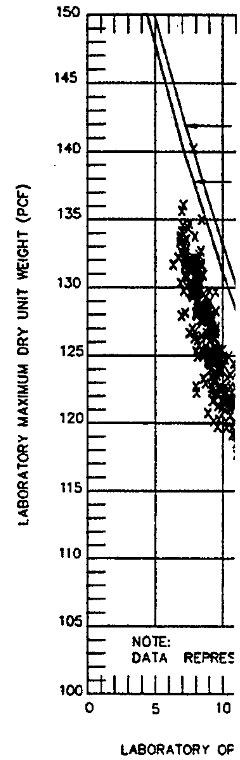
NOTE:
1. REFERENCE EM 1110-2-1906 AND ASTM D 698 STANDARD EFFORT

YEAR	FROM	TO	# TESTS	MEAN	STD DEV	≤ 10%	MEDIAN	≥ 90%
- - - - - - - -	01-01-92	12-31-92	179	9.7	1.2	8.3	9.6	11.2
— — — —	01-01-91	12-31-91	35	9.4	1.2	8.0	9.2	10.6
—— - ——	01-01-90	12-31-90	110	8.3	1.1	7.0	8.1	9.5
————	01-01-90	12-31-92	324	9.2	1.4	7.5	9.1	10.8



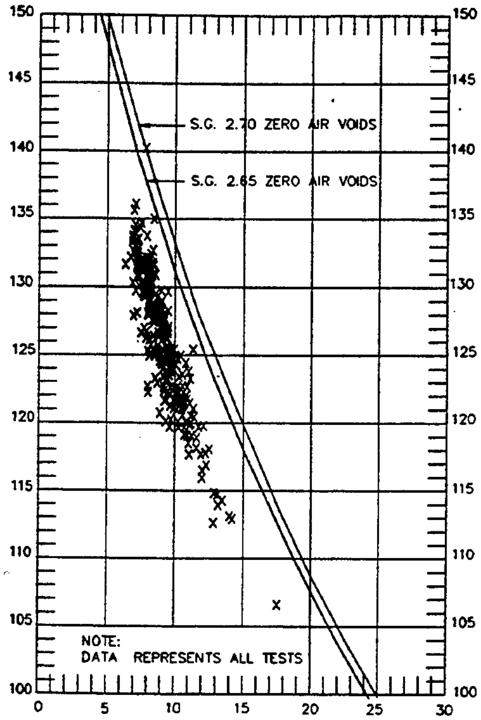
LABORATORY OPTIMUM MOISTURE CONTENT – S-CURVE

NOTE:
1. REFERENCE EM 1110-2-1906 AND ASTM D 698, STANDARD EFFORT



OPTIMUM MOISTURE

NOTE:
AVERAGE SPE



OPTIMUM MOISTURE VS. MAXIMUM DRY DENSITY

NOTE:
AVERAGE SPECIFIC GRAVITY = 2.6

LEGEND

④	- - - - - - - -	1992
③	— — — —	1991
②	—— - - ——	1990
①	————————	1990, 1991, & 1992
	STD DEV	STANDARD DEVIATION
	PCF	POUNDS PER CUBIC FOOT
	SG	SPECIFIC GRAVITY

LITTLE DELL LAKE
SALT LAKE CITY STREAMS, UTAH

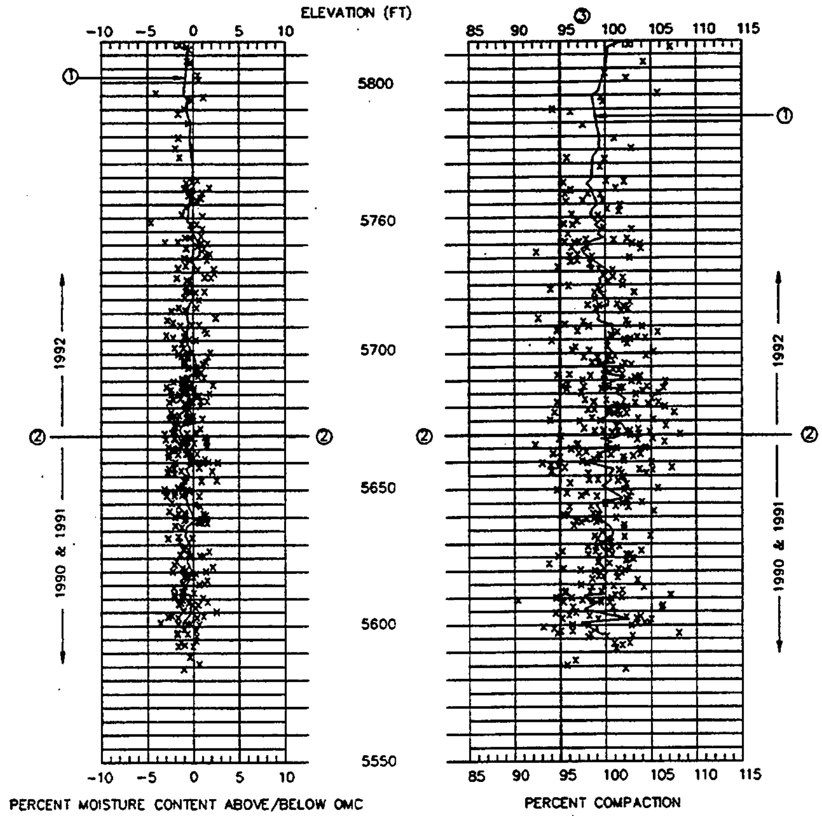
EMBANKMENT

RANDOM II – COMPACTION TEST RESULTS

DEPARTMENT OF THE ARMY
SACRAMENTO DISTRICT, CORPS OF ENGINEERS
SACRAMENTO, CALIFORNIA

SUBMITTED: MICHAEL D. RAMSBOTHAM			APPROVED: RESIDENT ENGINEER
DR. BY: GEB	CHECKED BY: MDR		PLATE 24

2

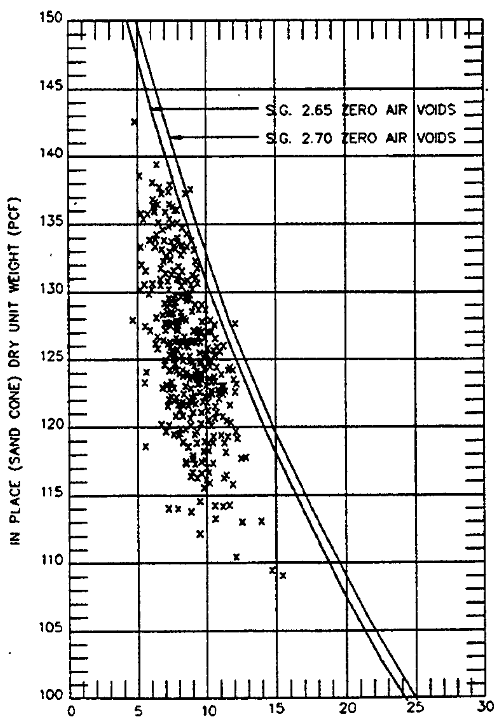


NOTES:

① CURVE REPRESENTS A RUNNING AVERAGE OF 10 TESTS

② COFFERDAM REACHED EL. 5685 TO EL. 5690 AT THE CREST. APPROXIMATE ELEVATION OF THE RANDOM II SHELL AT THE END OF THE 1991 CONSTRUCTION SEASON WAS 5670 FT.

③ 95% – DESIRED MINIMUM; 99% – DESIRED AVERAGE

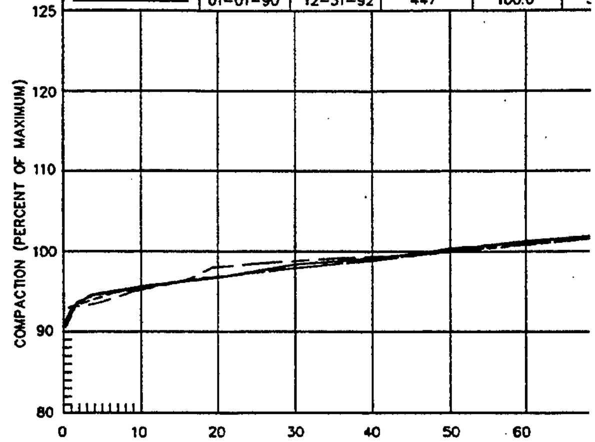


MOISTURE VS. DENSITY

NOTES:

1. DATA REPRESENTS ALL TESTS
2. REFERENCE ASTM D1556, DENSITY OF SOIL IN PLACE BY SAND CONE METHOD

YEAR	FROM	TO	# TESTS	MEAN	STD
(short dashed line)	01-01-92	12-31-92	185	100.0	3
(long dashed line)	01-01-91	12-31-91	61	100.3	3
(dash-dot line)	01-01-90	12-31-90	201	99.9	3
(solid line)	01-01-90	12-31-92	447	100.0	3



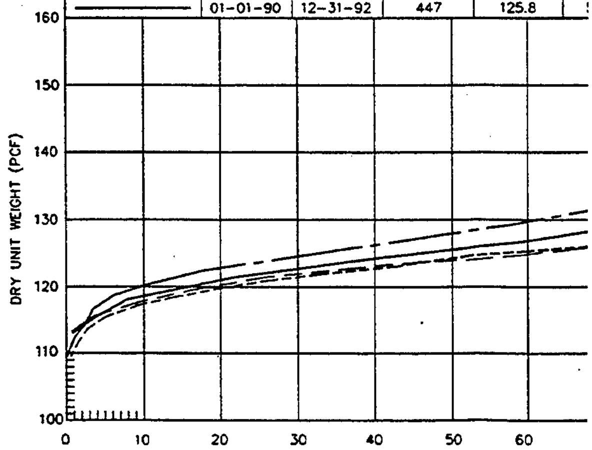
IN PLACE COMPACTION – S-CU

NOTES:

① REFERENCE I STANDARD E

② REFERENCE BY SAND CO

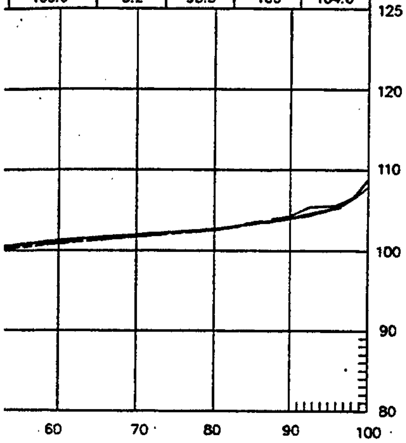
YEAR	FROM	TO	# TESTS	MEAN	STD
(short dashed line)	01-01-92	12-31-92	185	124.1	
(long dashed line)	01-01-91	12-31-91	61	124.1	
(dash-dot line)	01-01-90	12-31-90	201	127.9	
(solid line)	01-01-90	12-31-92	447	125.8	



IN PLACE UNIT WEIGHT – S-CI

LITTLE DELL PROJECT: PL-25 24 MAY 94 NLB

MEAN	STD DEV	≤ 10%	MEDIAN	≥ 90%
100.0	3.2	95.6	100	103.9
100.3	3.3	95.5	100.2	103.9
99.9	3.3	95.5	99.9	104.0
100.0	3.2	95.5	100	104.0



COMPACTION THAN SHOWN

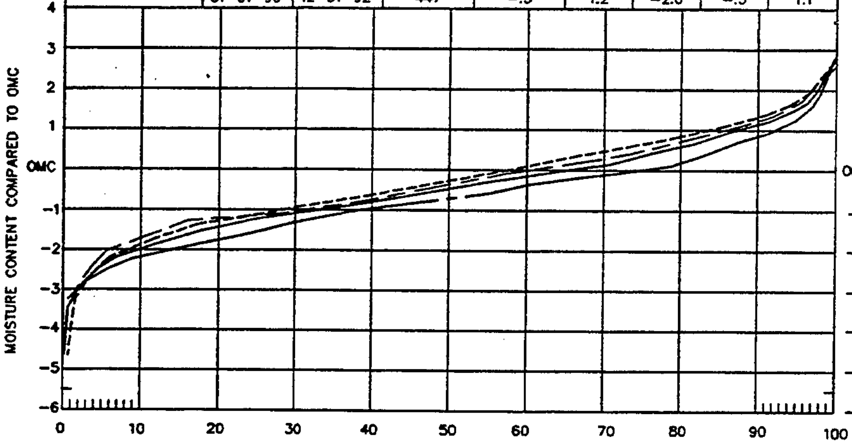
ION – S-CURVE

TES:

1) REFERENCE EM 1110-2-1906 AND ASTM D698, STANDARD EFFORT

2) REFERENCE ASTM D 1556, DENSITY OF SOIL IN PLACE BY SAND CONE METHOD

YEAR	FROM	TO	# TESTS	MEAN	STD DEV	≤ 10%	MEDIAN	≥ 90%
----------	01-01-92	12-31-92	185	-.3	1.3	-1.9	-.4	1.3
— — — — —	01-01-91	12-31-91	61	-.26	1.2	-1.7	-.4	1.0
——— — ———	01-01-90	12-31-90	201	-.7	1.2	-2.1	-.7	0.9
————————	01-01-90	12-31-92	447	-.5	1.2	-2.0	-.5	1.1



PERCENT OF TESTS WITH LESS VARITATION THAN SHOWN

OMC COMPARISON – S-CURVES

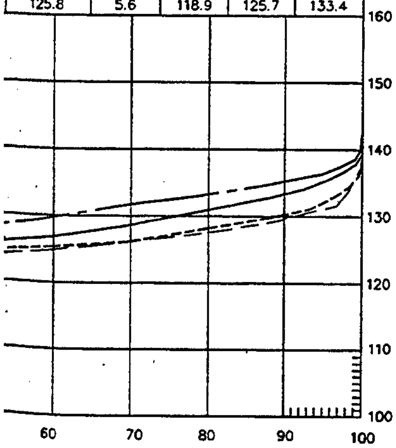
NOTES:

1) REFERENCE EM 1110-2-1906 AND ASTM D698, STANDARD EFFORT

2) REFERENCE ASTM D 1556, DENSITY OF SOIL IN PLACE BY SAND CONE METHOD

3) OMC = OPTIMUM MOISTURE CONTENT

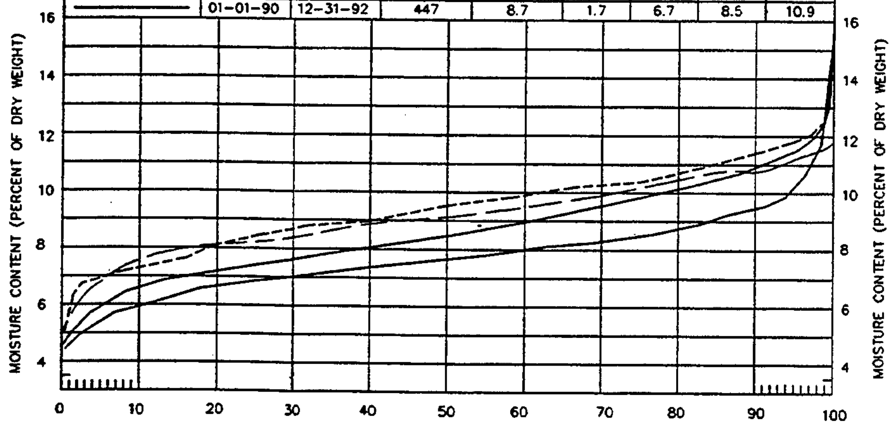
MEAN	STD DEV	≤ 10%	MEDIAN	≥ 90%
124.1	4.9	117.5	124.4	129.8
124.1	4.4	118.2	123.9	128.7
127.9	5.8	120.2	128.1	135.1
125.8	5.6	118.9	125.7	133.4



R. WEIGHT THAN SHOWN

HT – S-CURVE

YEAR	FROM	TO	# TESTS	MEAN	STD DEV	≤ 10%	MEDIAN	≥ 90%
----------	01-01-92	12-31-92	185	9.4	1.6	7.2	9.5	11.4
— — — — —	01-01-91	12-31-91	61	9.2	1.3	7.4	9.2	10.8
——— — ———	01-01-90	12-31-90	201	7.8	1.5	6.0	7.6	9.4
————————	01-01-90	12-31-92	447	8.7	1.7	6.7	8.5	10.9



PERCENT OF TESTS WITH LOWER MOISTURE THAN SHOWN

IN PLACE MOISTURE CONTENT – S-CURVE

LEGEND

----------	1992
— — — — —	1991
——— — ———	1990
————————	1990, 1991, & 1992

PCF = POUNDS PER CUBIC FOOT
OMC = OPTIMUM MOISTURE CONTENT
SG = SPECIFIC GRAVITY
STD DEV = STANDARD DEVIATION

LITTLE DELL LAKE
SALT LAKE CITY STREAMS, UTAH

EMBANKMENT

RANDOM II – CONSTRUCTION PLACEMENT DATA

DEPARTMENT OF THE ARMY
SACRAMENTO DISTRICT, CORPS OF ENGINEERS
SACRAMENTO, CALIFORNIA

SUBMITTED: MICHAEL D. RAMSBOTHAM

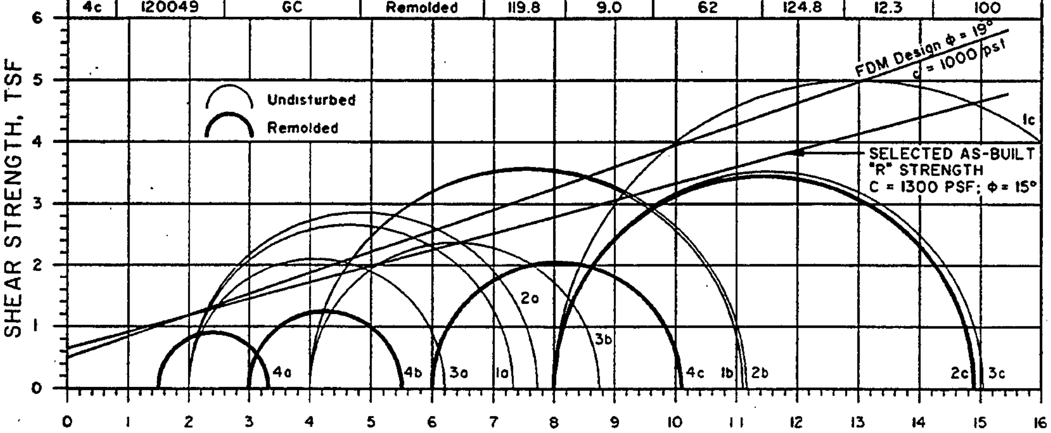
APPROVED: RESIDENT ENGINEER

DR. BY: GEB | CHECKED BY: MDR

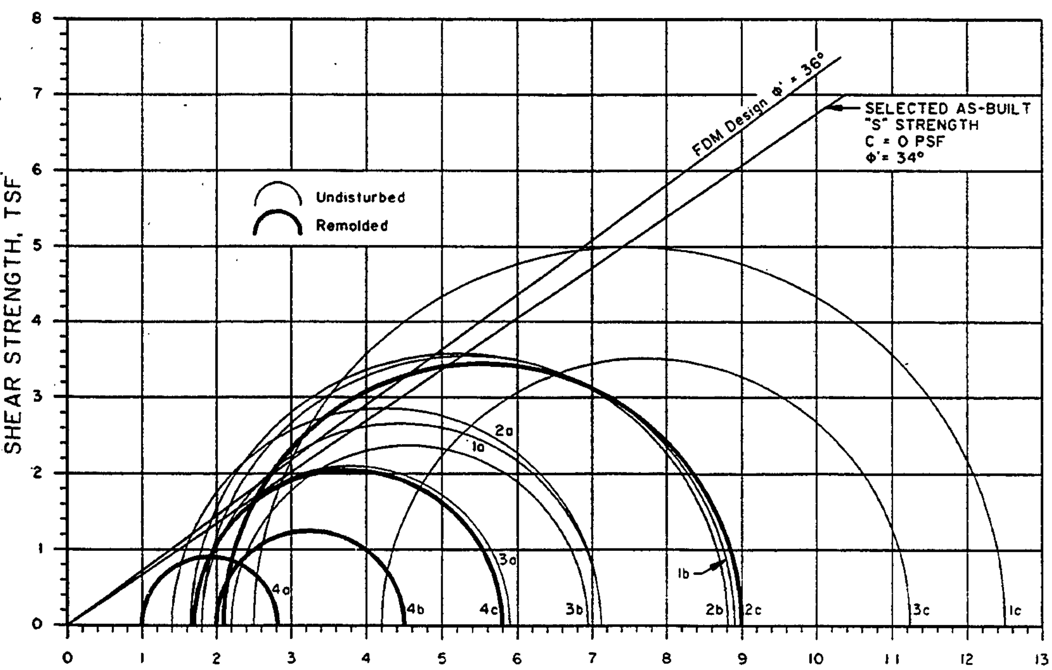
PLATE 25

2

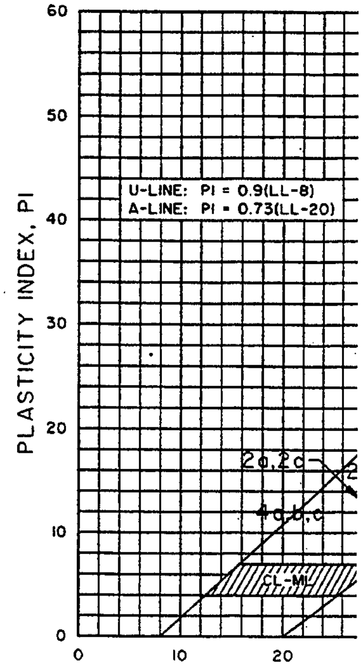
NO.	DIVISION SAMPLE NO.	MATERIAL CLASS. SYMBOL	TYPE OF SAMPLE	PROPERTIES: INITIAL: DRY DENSITY (PCF)	INITIAL: MOISTURE CONTENT (%)	INITIAL: SATURATION (%)	BEFORE SHEAR: DRY DENSITY (PCF)	BEFORE SHEAR: MOISTURE CONTENT (%)	BEFORE SHEAR: SATURATION (%)
1a	113016	SC	Undisturbed	117.0	12.1	34	123.1	13.0	100
1b	113017	SC	Undisturbed	116.4	10.1	64	122.7	13.1	100
1c	113018	SC	Undisturbed	114.4	11.1	66	124.6	12.4	100
2a	114268	GC	Undisturbed	127.4	6.8	60	128.9	10.7	100
2b	114269	GC	Undisturbed	127.8	9.7	87	129.0	10.7	100
2c	114270	GC	Remolded	121.4	6.3	46	128.1	11.0	100
3a	118235	GC	Undisturbed	118.4	11.5	76	121.1	13.3	96
3b	118234	SC	Undisturbed	114.3	12.0	71	119.8	13.8	96
3c	118233	GC	Undisturbed	116.6	11.3	72	122.5	12.7	96
4a	120049	GC	Remolded	119.5	9.0	62	121.8	13.5	100
4b	120049	GC	Remolded	119.5	9.0	62	123.5	12.8	100
4c	120049	GC	Remolded	119.8	9.0	62	124.8	12.3	100



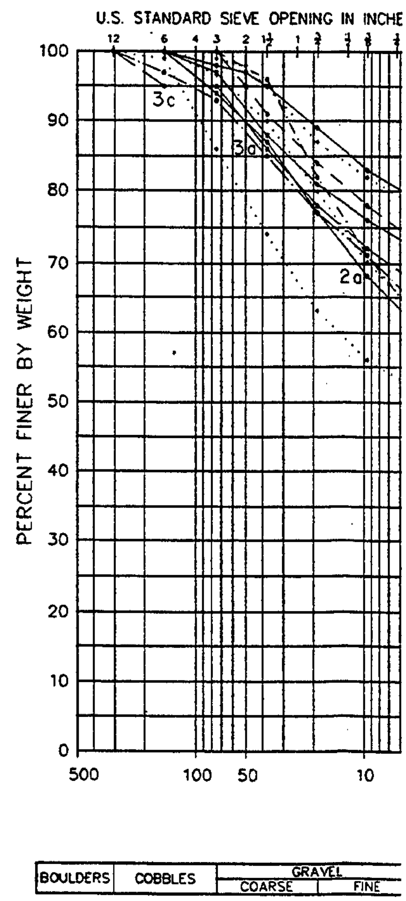
"$\overline{R}$" TRIAXIAL SHEAR STRENGTH (RANDOM II)



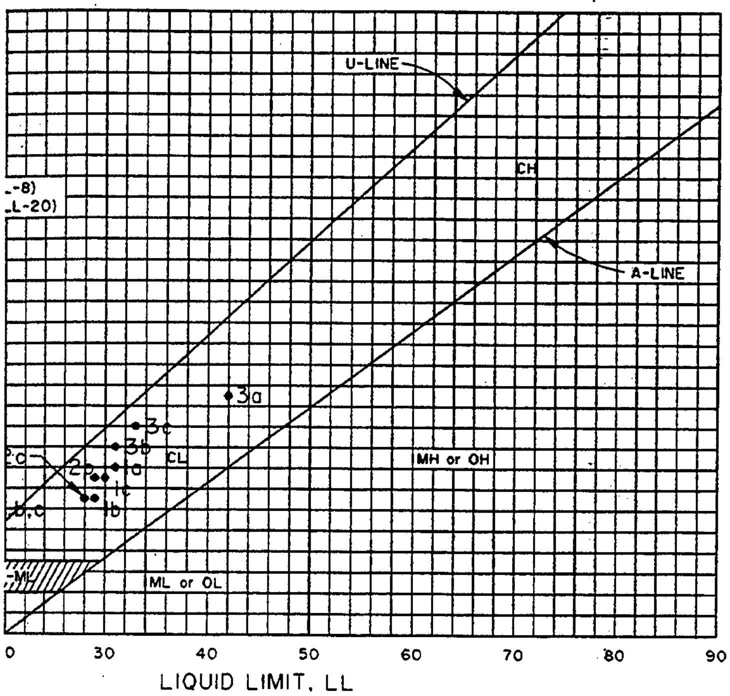
"S" TRIAXIAL SHEAR STRENGTH (RANDOM II)



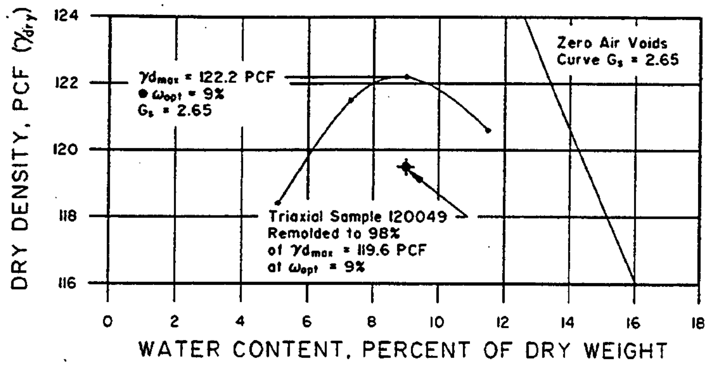
AT



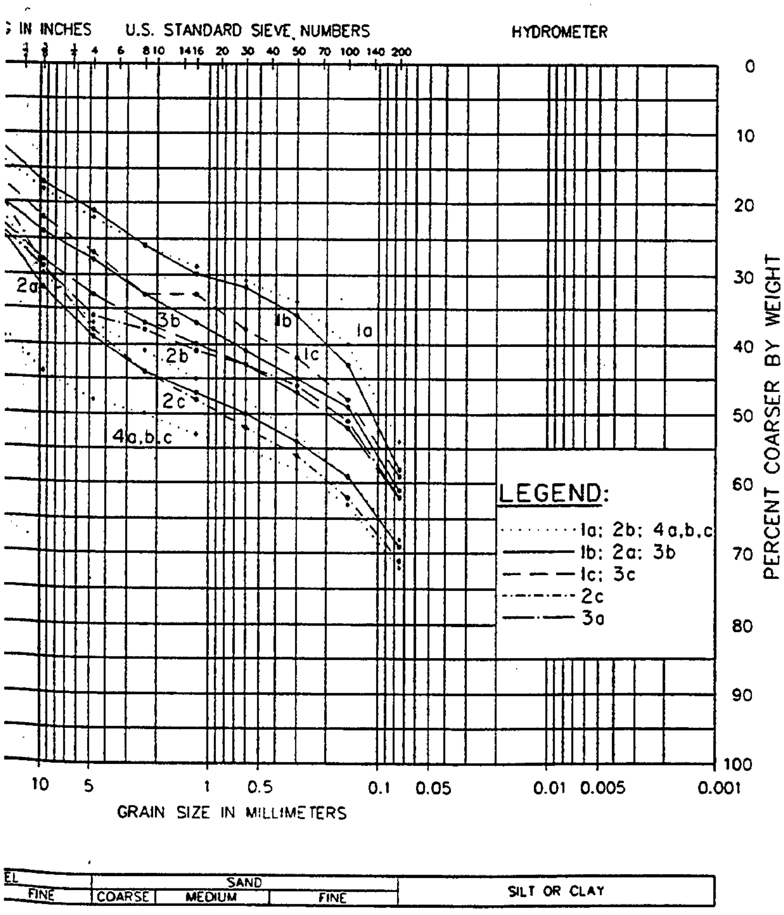
GRAD



ATTERBERG LIMITS (RANDOM II)



STANDARD COMPACTION TEST
(RANDOM II)



GRADATION CURVES (RANDOM II)

RECORD SAMPLING DATA
(RANDOM II)

DIVISION SAMPLE NO.	DATE OF SAMPLE	LOCATION		
		STATION	ELEVATION (Feet)	OFFSET
113016	5-7 Jun 90	22+50	5666.5	320.5' u/s
113017	5-7 Jun 90	22+50	5666.5	320.5' u/s
114268	8-9 Sep 90	12+75	5682.0	410' u/s
114269	8-9 Sep 90	12+75	5682.0	410' u/s
114270	8-9 Sep 90	12+75	5682.0	410' u/s
118233	30 Oct - 3 Nov 91	17+50	5671.3	100' u/s
118234	30 Oct - 3 Nov 91	17+50	5671.3	100' u/s
118235	30 Oct - 3 Nov 91	17+50	5671.3	100' u/s
120049	15-22 Jun 92	Various	5780.0	Varies u/s

LITTLE DELL LAKE
SALT LAKE CITY STREAMS, UTAH

RANDOM II FILL
RECORD TEST RESULTS

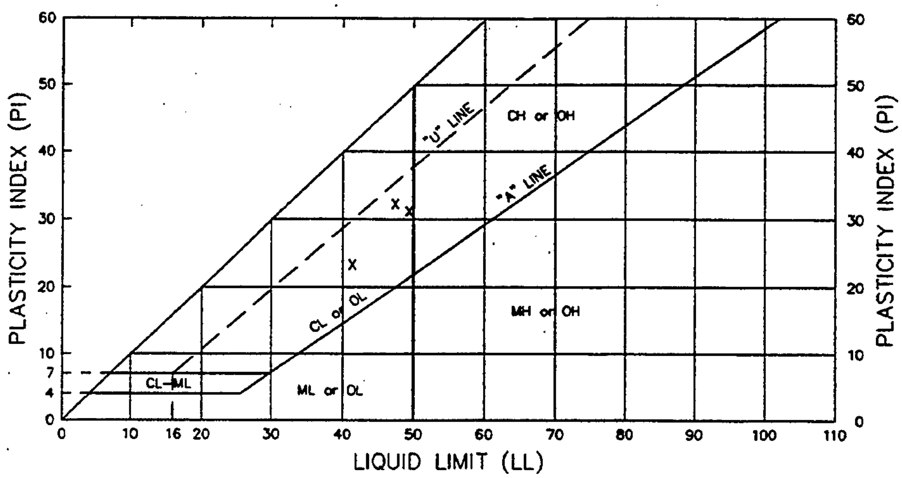
DEPARTMENT OF THE ARMY
SACRAMENTO DISTRICT, CORPS OF ENGINEERS
SACRAMENTO, CALIFORNIA

SUBMITTED: DAVE RICKETTS

SUBMITTED: RESIDENT ENGINEER

N. BOLAND | D. R.

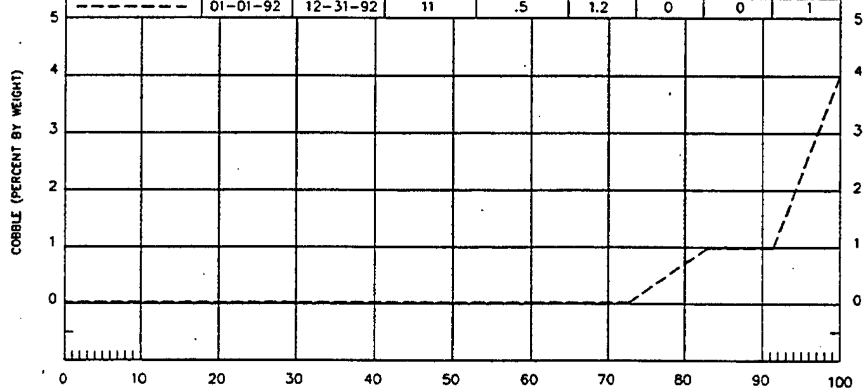
PLATE 26



PLASTICITY CHART

NOTE: X REPRESENTS ALL TEST DATA.

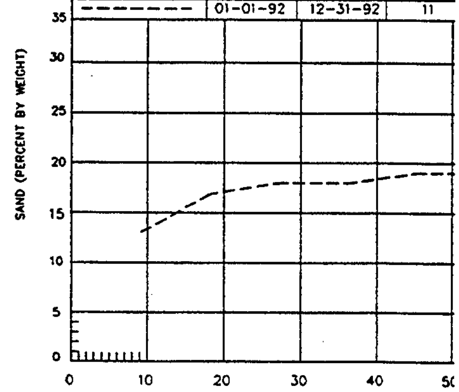
YEAR	FROM	TO	# TESTS	MEAN	STD DEV	≤ 10%	MEDIAN	≥ 90%
--------	01-01-92	12-31-92	11	.5	1.2	0	0	1



PERCENT OF TESTS WITH LOWER COBBLE CONTENT THAN SHOWN

COBBLE – S-CURVE

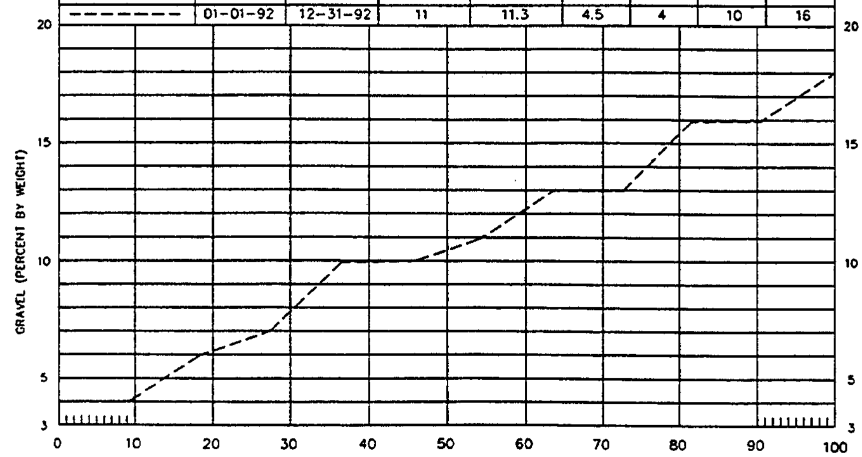
YEAR	FROM	TO	# TESTS
--------	01-01-92	12-31-92	11



PERCENT OF TESTS WITH LOWER

SAND –

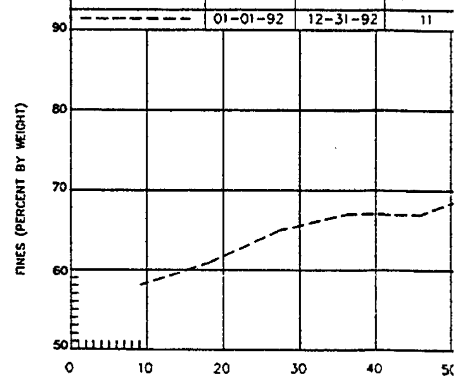
YEAR	FROM	TO	# TESTS	MEAN	STD DEV	≤ 10%	MEDIAN	≥ 90%
--------	01-01-92	12-31-92	11	11.3	4.5	4	10	16



PERCENT OF TESTS WITH LOWER GRAVEL CONTENT THAN SHOWN

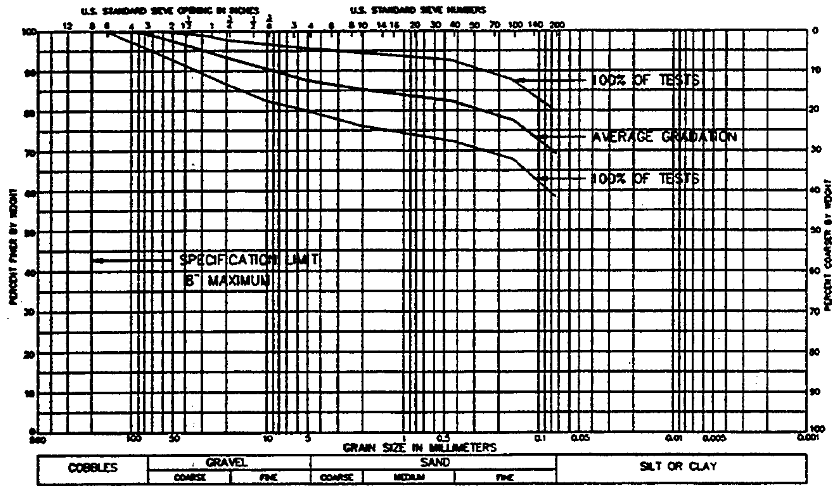
GRAVEL – S-CURVE

YEAR	FROM	TO	# TESTS
--------	01-01-92	12-31-92	11



PERCENT OF TESTS WITH LOWER

FINES –

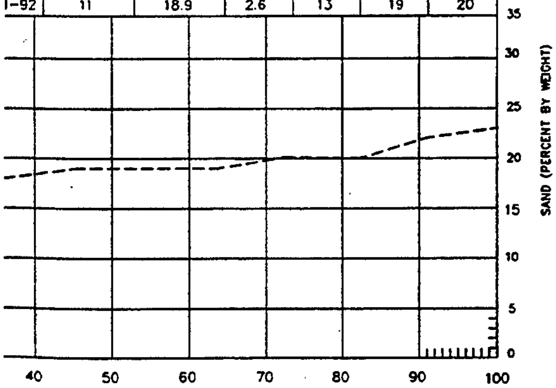


GRADATION CURVES

NOTES:

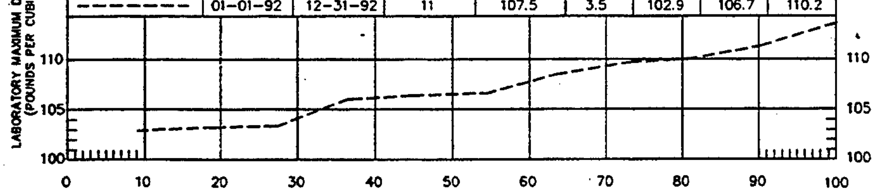
1. AVERAGE GRADATION 1992
2. REPRESENTS MATERIAL PLACED BETWEEN EL. 5665 AND EL. 5686.5

)	# TESTS	MEAN	STD DEV	≤ 10%	MEDIAN	≥ 90%
1-92	11	18.9	2.6	13	19	20



SAND – S-CURVE

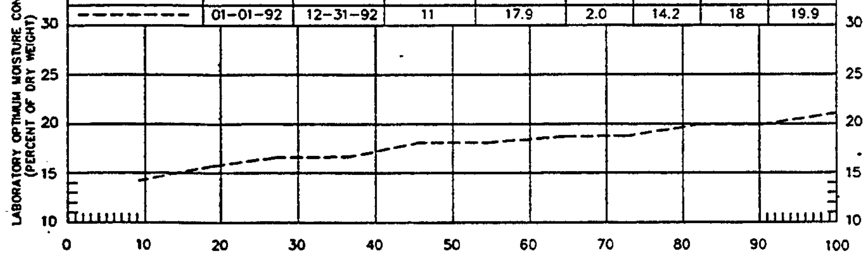
YEAR	FROM	TO	# TESTS	MEAN	STD DEV	≤ 10%	MEDIAN	≥ 90%
--------	01-01-92	12-31-92	11	107.5	3.5	102.9	106.7	110.2



LABORATORY MAXIMUM DRY DENSITY – S-CURVE

NOTE: 1. REFERENCE EM 1110-2-1906 AND ASTM D698, STANDARD EFFORT

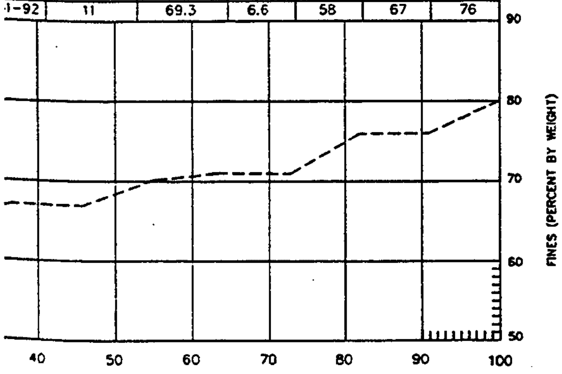
YEAR	FROM	TO	# TESTS	MEAN	STD DEV	≤ 10%	MEDIAN	≥ 90%
--------	01-01-92	12-31-92	11	17.9	2.0	14.2	18	19.9



LABORATORY OPTIMUM MOISTURE CONTENT – S-CURVE

NOTE: 1. REFERENCE EM 1110-2-1906 AND ASTM D698, STANDARD EFFORT

)	# TESTS	MEAN	STD DEV	≤ 10%	MEDIAN	≥ 90%
1-92	11	69.3	6.6	58	67	76



FINES – S-CURVE

LEGEND

-------- 1992

STD DEV STANDARD DEVIATION

LITTLE DELL LAKE
SALT LAKE CITY STREAMS, UTAH

EMBANKMENT
RANDOM IV
CLASSIFICATION AND COMPACTION TEST RESULTS

DEPARTMENT OF THE ARMY
SACRAMENTO DISTRICT, CORPS OF ENGINEERS
SACRAMENTO, CALIFORNIA

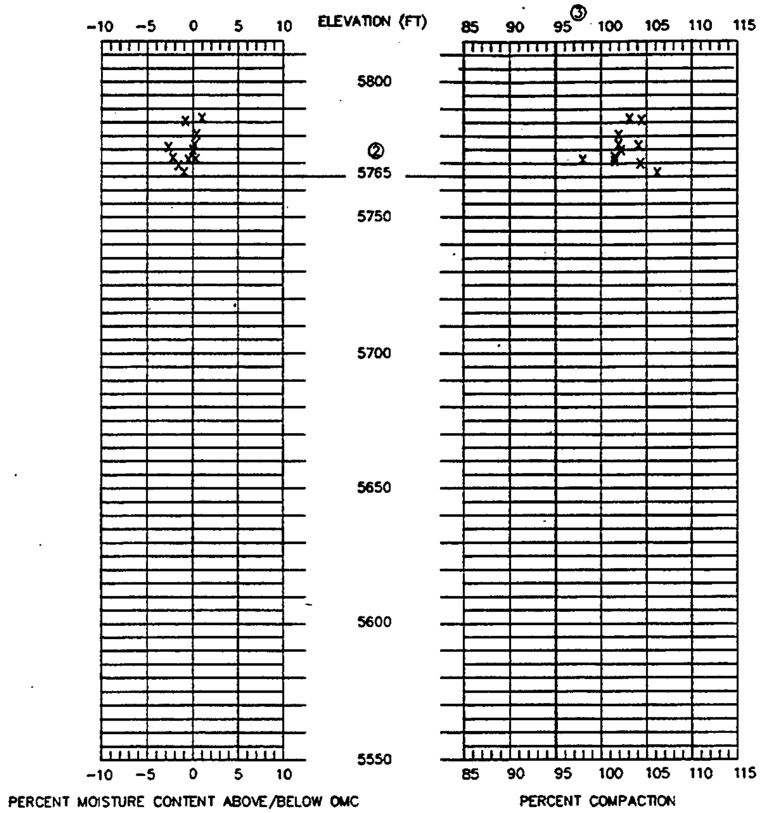
SUBMITTED: MICHAEL D. RAMSBOTHAM

APPROVED: RESIDENT ENGINEER

DR. BY: GEB | CHECKED BY: MDR

PLATE 27

2



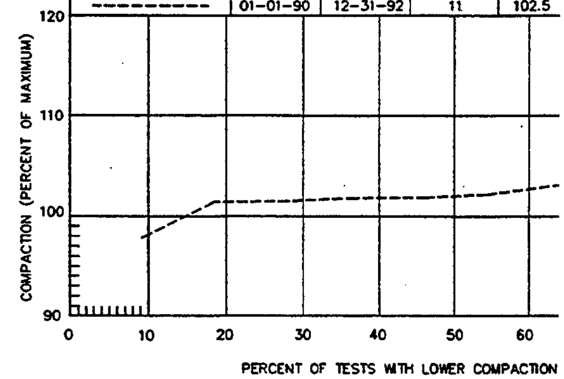
NOTES:

① RANDOM IV ZONE IS A PART OF THE U/S SHELL THAT WAS PREVIOUSLY RANDOM II BY DESIGN

② RANDOM IV WAS ONLY PLACED BETWEEN EL. 5765 AND EL. 5786.5

③ 95% – DESIRED MINIMUM; 99% – DESIRED AVERAGE

YEAR	FROM	TO	# TESTS	MEAN
----------	01-01-90	12-31-92	11	102.5



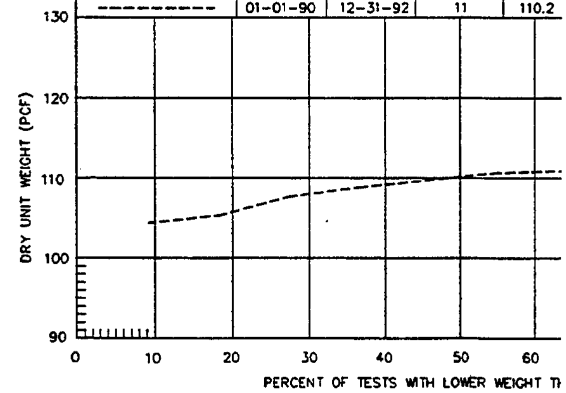
IN PLACE COMPACTION – S-

NOTES:

① REFE STAN

② REFE BY S

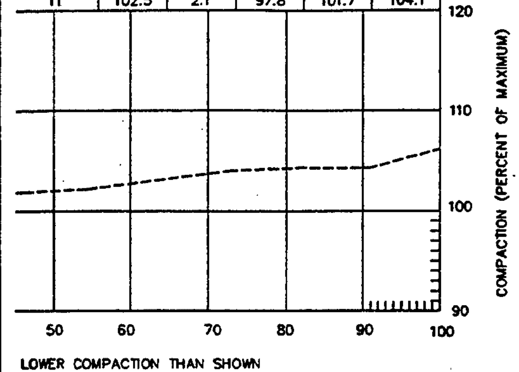
YEAR	FROM	TO	# TESTS	MEAN
----------	01-01-90	12-31-92	11	110.2



IN PLACE UNIT WEIGHT – S-

LITTLE DELL PROJECT: PL-28 24 MAY 94 NLB

# TESTS	MEAN	STD DEV	≤ 10%	MEDIAN	≥ 90%
11	102.5	2.1	97.8	101.7	104.1



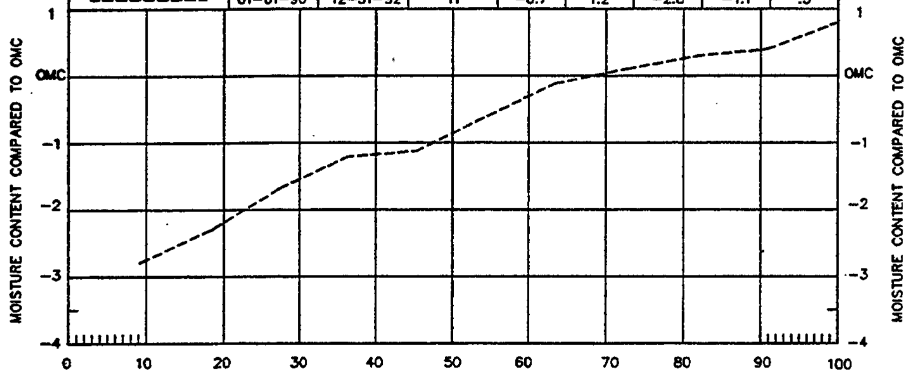
PACTION – S–CURVE

NOTES:

① REFERENCE EM 1110–2–1906 AND ASTM D698, STANDARD EFFORT

② REFERENCE ASTM D 1556, DENSITY OF SOIL IN PLACE BY SAND CONE METHOD

YEAR	FROM	TO	# TESTS	MEAN	STD DEV	≤ 10%	MEDIAN	≥ 90%
----------	01–01–90	12–31–92	11	–0.7	1.2	–2.8	–1.1	.3



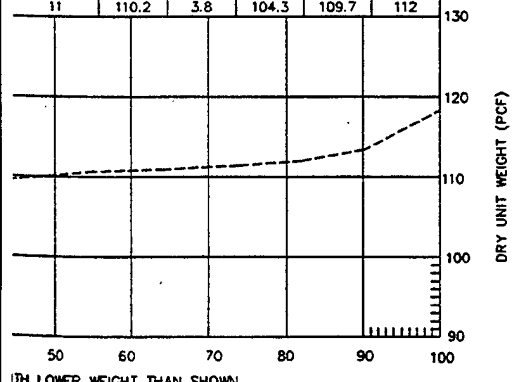
OMC COMPARISON – S–CURVES

NOTES:

① REFERENCE EM 1110–2–1906 AND ASTM D698, STANDARD EFFORT

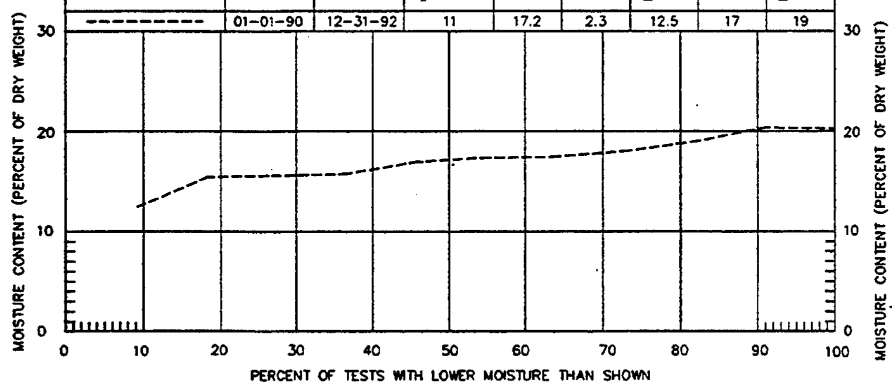
② REFERENCE ASTM D 1556, DENSITY OF SOIL IN PLACE BY SAND CONE METHOD

# TESTS	MEAN	STD DEV	≤ 10%	MEDIAN	≥ 90%
11	110.2	3.8	104.3	109.7	112



WEIGHT – S–CURVE

YEAR	FROM	TO	# TESTS	MEAN	STD DEV	≤ 10%	MEDIAN	≥ 90%
----------	01–01–90	12–31–92	11	17.2	2.3	12.5	17	19



IN PLACE MOISTURE CONTENT – S–CURVE

LEGEND

---------- 1992

OMC = OPTIMUM MOISTURE CONTENT
PCF = POUNDS PER CUBIC FOOT
STD DEV = STANDARD DEVIATION

LITTLE DELL LAKE
SALT LAKE CITY STREAMS, UTAH

EMBANKMENT

RANDOM IV – CONSTRUCTION PLACEMENT DATA

DEPARTMENT OF THE ARMY
SACRAMENTO DISTRICT, CORPS OF ENGINEERS
SACRAMENTO, CALIFORNIA

SUBMITTED:

MICHAEL D. RAMSBOTHAM

APPROVED:

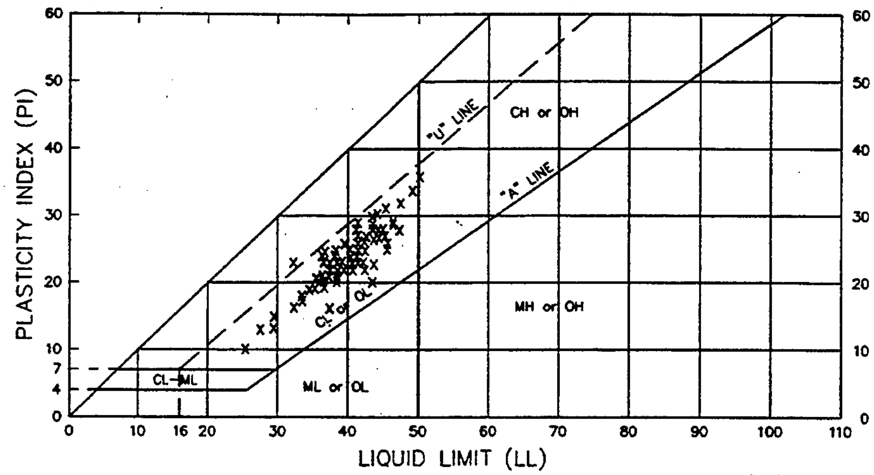
RESIDENT ENGINEER

DR. BY: GEB

CHECKED BY: MDR

PLATE 28

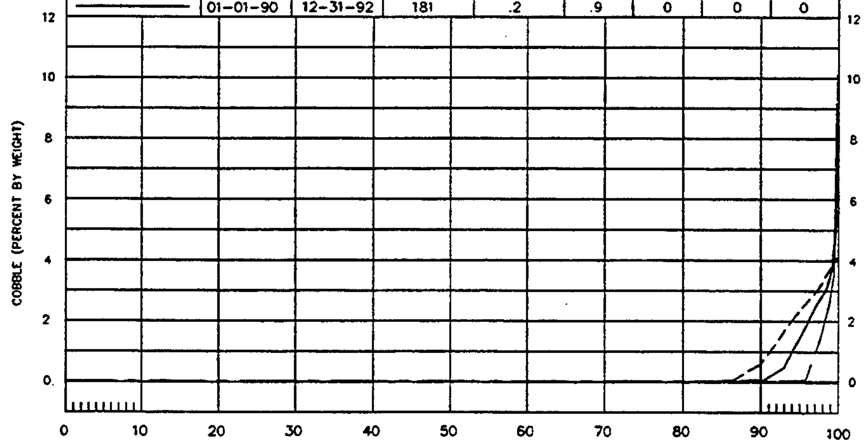
(2)



PLASTICITY CHART

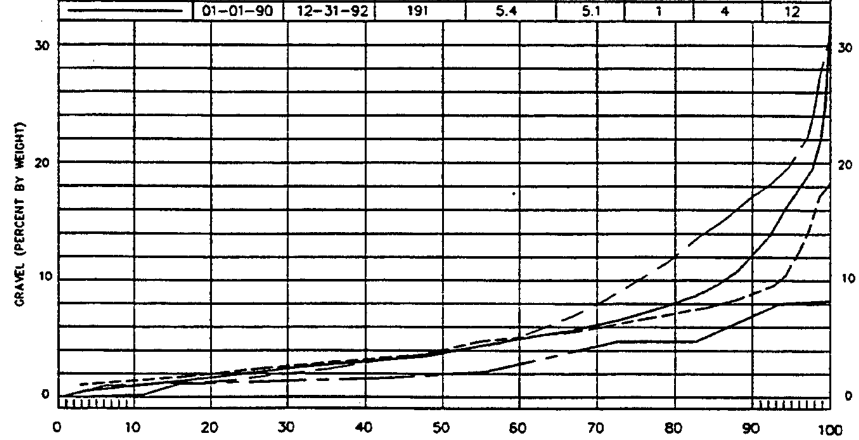
NOTE: X REPRESENTS ALL TEST DATA FOR 1990, 1991 AND 1992.

YEAR	FROM	TO	# TESTS	MEAN	STD DEV	≤ 10%	MEDIAN	≥ 90%
--------	01-01-92	12-31-92	103	.2	.8	0	0	0
— — — —	01-01-91	12-31-91	70	.2	1.2	0	0	0
—— – ——	01-01-90	12-31-90	18	0	0	0	0	0
————	01-01-90	12-31-92	181	.2	.9	0	0	0

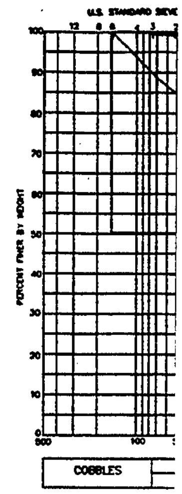


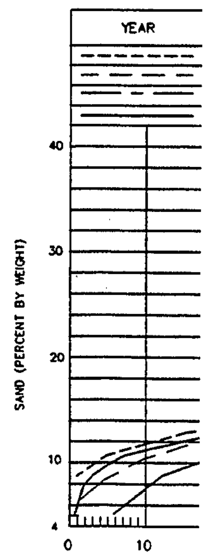
COBBLE – S-CURVE

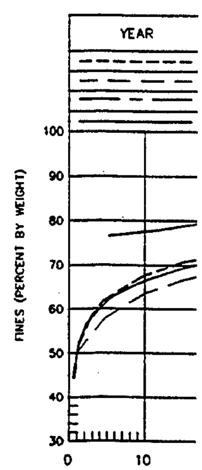
YEAR	FROM	TO	# TESTS	MEAN	STD DEV	≤ 10%	MEDIAN	≥ 90%
--------	01-01-92	12-31-92	103	4.8	3.6	1	4	9
— — — —	01-01-91	12-31-91	70	6.9	6.9	1	4	16
—— – ——	01-01-90	12-31-90	18	3.1	2.6	0	2	7
————	01-01-90	12-31-92	191	5.4	5.1	1	4	12



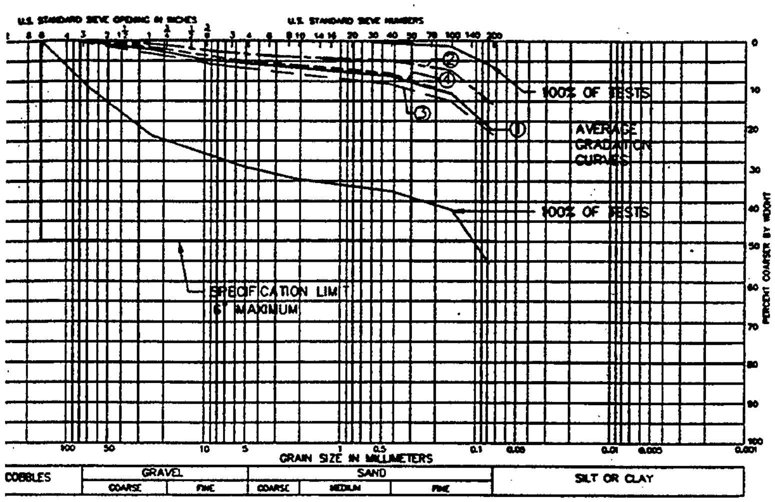
GRAVEL – S-CURVE







LITTLE DELL PROJECT: PL-29 24 MAY 94 NLB

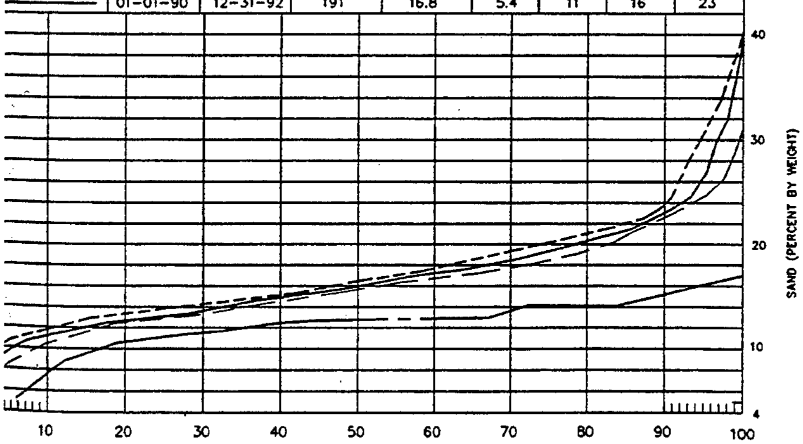


GRADATION CURVES

LEGEND

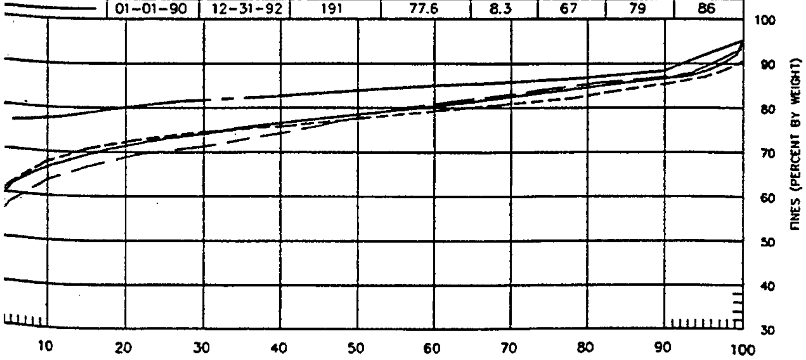
④ - - - - - - - 1992
③ – — – — 1991
② — — — 1990
① ——— 1990, 1991, & 1992
STD DEV STANDARD DEVIATION

YEAR	FROM	TO	# TESTS	MEAN	STD DEV	≤ 10%	MEDIAN	≥ 90%
	01-01-92	12-31-92	103	17.9	5.8	12	16	24
	01-01-91	12-31-91	70	16.3	4.7	10	16	22.5
	01-01-90	12-31-90	18	12.5	2.7	5	13	15
	01-01-90	12-31-92	191	16.8	5.4	11	16	23



SAND – S-CURVE

YEAR	FROM	TO	# TESTS	MEAN	STD DEV	≤ 10%	MEDIAN	≥ 90%
	01-01-92	12-31-92	103	77.1	7.4	68	78	85
	01-01-91	12-31-91	70	76.7	9.5	64	77	87
	01-01-90	12-31-90	18	84.4	4.4	77	83	88
	01-01-90	12-31-92	191	77.6	8.3	67	79	86



FINES – S-CURVE

LITTLE DELL LAKE
SALT LAKE CITY STREAMS, UTAH

EMBANKMENT

IMPERVIOUS CORE CLASSIFICATION TEST RESULTS

DEPARTMENT OF THE ARMY
SACRAMENTO DISTRICT, CORPS OF ENGINEERS
SACRAMENTO, CALIFORNIA

SUBMITTED: MICHAEL D. RAMSBOTHAM

APPROVED: RESIDENT ENGINEER

DR. BY: GEB

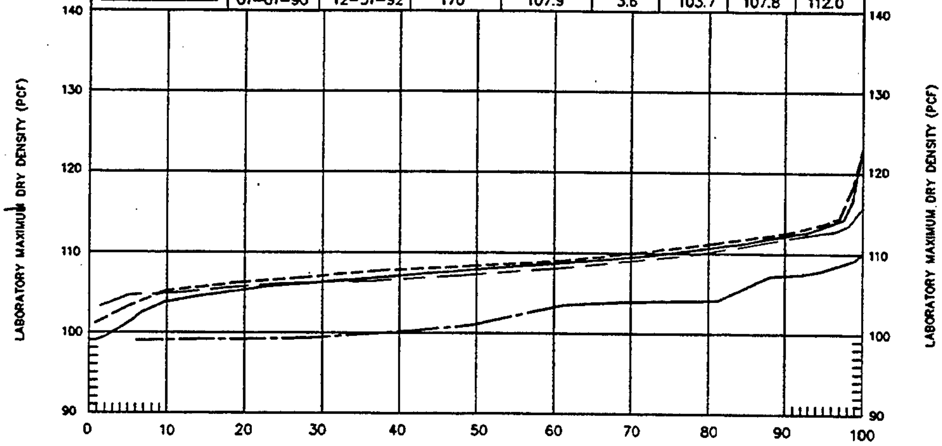
CHECKED BY: MDR

PLATE 29

(2)

LITTLE DELL PROJECT: PL-30 24 MAY 94 NLB

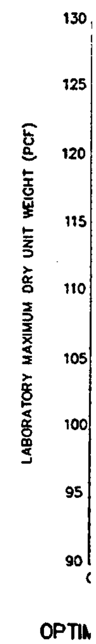
YEAR	FROM	TO	# TESTS	MEAN	STD DEV	≤ 10%	MEDIAN	≥ 90%
- - - - - - - -	01-01-92	12-31-92	100	108.7	3.4	105.1	108.4	112.4
— — — —	01-01-91	12-31-91	54	108.0	2.8	104.9	107.4	111.7
—— - —	01-01-90	12-31-90	16	102.5	3.3	99.0	100.9	107.1
————	01-01-90	12-31-92	170	107.9	3.6	103.7	107.8	112.0



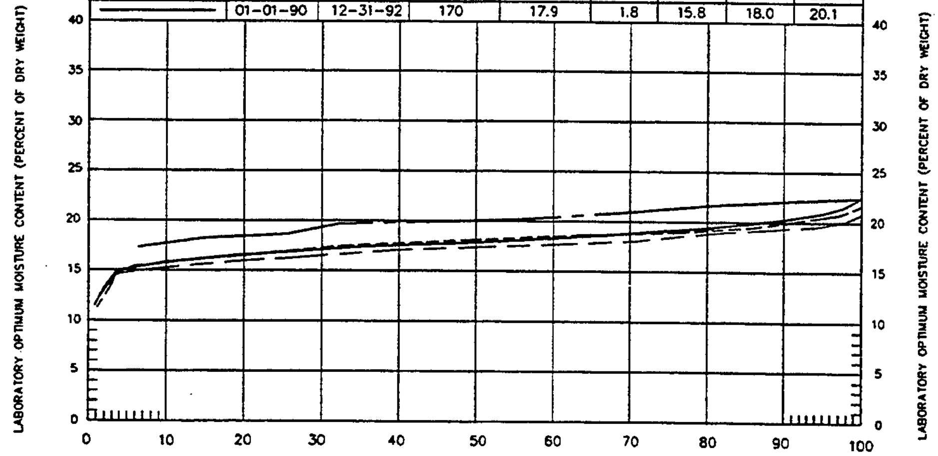
LABORATORY MAXIMUM DRY DENSITY – S-CURVE

NOTE:

1. REFERENCE EM 1110-2-1906 AND ASTM D 698, STANDARD EFFORT



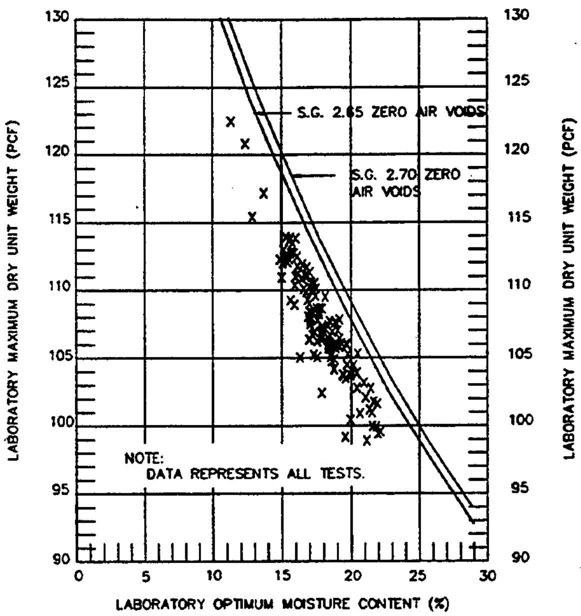
YEAR	FROM	TO	# TESTS	MEAN	STD DEV	≤ 10%	MEDIAN	≥ 90%
- - - - - - - -	01-01-92	12-31-92	100	17.9	1.7	15.8	18.0	19.9
— — — —	01-01-91	12-31-91	54	17.4	1.5	15.0	17.4	18.9
—— - —	01-01-90	12-31-90	16	20.3	1.6	17.2	20.2	22.1
————	01-01-90	12-31-92	170	17.9	1.8	15.8	18.0	20.1



LABORATORY OPTIMUM MOISTURE CONTENT – S-CURVE

NOTE:

1. REFERENCE EM 1110-2-1906 AND ASTM D 698, STANDARD EFFORT



OPTIMUM MOISTURE VS. MAXIMUM DRY DENSITY

NOTE: AVERAGE SPECIFIC GRAVITY = 2.6

LEGEND

④ - - - - - - - 1992
③ — — — — 1991
② ——— - - ——— 1990
① ———————— 1990, 1991, & 1992

PCF = POUNDS PER CUBIC FOOT
SG = SPECIFIC GRAVITY
STD DEV = STANDARD DEVIATION

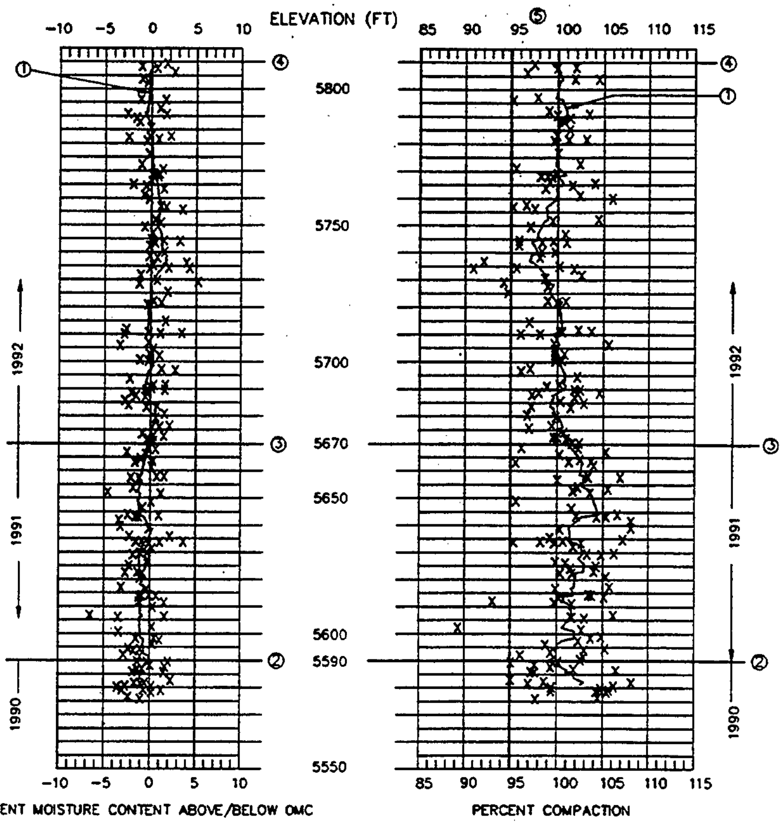
LITTLE DELL LAKE
SALT LAKE CITY STREAMS, UTAH

EMBANKMENT
IMPERVIOUS CORE COMPACTION TEST RESULTS

DEPARTMENT OF THE ARMY
SACRAMENTO DISTRICT, CORPS OF ENGINEERS
SACRAMENTO, CALIFORNIA

SUBMITTED: MICHAEL D. RAMSBOTHAM			APPROVED: RESIDENT ENGINEER
GEB	MDR		PLATE 30

(2)



NOTES:

① CURVE REPRESENTS A RUNNING AVERAGE OF 10 TESTS

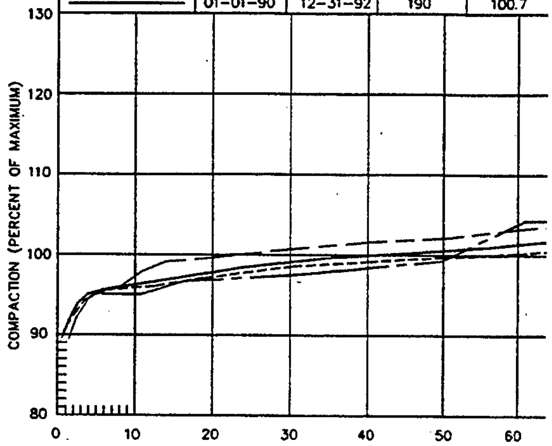
② APPROXIMATE ELEVATION OF THE CORE AT THE END OF THE 1990 CONSTRUCTION SEASON

③ APPROXIMATE ELEVATION OF THE CORE AT THE END OF THE 1991 CONSTRUCTION SEASON

④ TOP OF CORE AT EL. 5810

⑤ 95% – DESIRED MINIMUM; 99% – DESIRED AVERAGE

YEAR	FROM	TO	# TESTS	MEAN
----------	01-01-92	12-31-92	102	99.5
— — — —	01-01-91	12-31-91	70	102.1
——— —	01-01-90	12-31-90	18	101.5
————	01-01-90	12-31-92	190	100.7



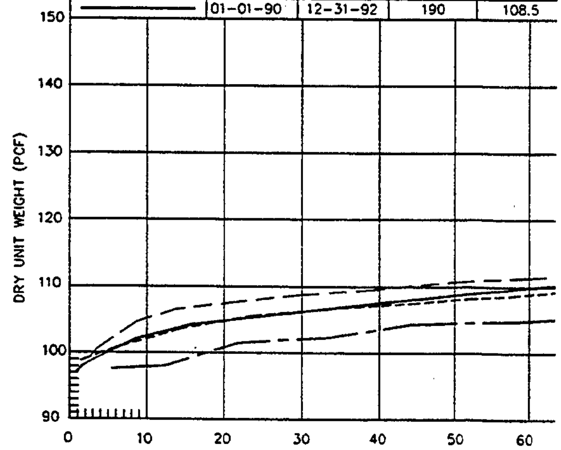
IN PLACE COMPACTION – S

NOTES:

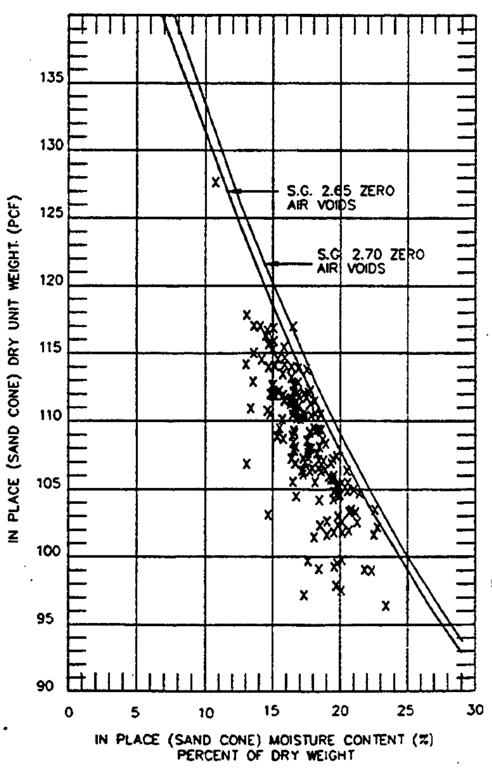
① REFEREN STANDAR

② REFEREN BY SAND

YEAR	FROM	TO	# TESTS	MEAN
----------	01-01-92	12-31-92	102	108.2
— — — —	01-01-91	12-31-91	70	110.1
——— —	01-01-90	12-31-90	18	104.0
————	01-01-90	12-31-92	190	108.5



IN PLACE UNIT WEIGHT – S



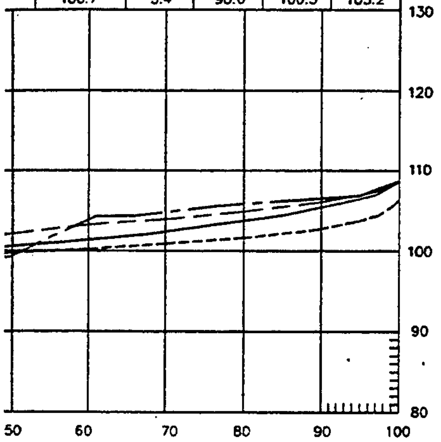
MOISTURE VS. DENSITY

NOTE:

1. DATA REPRESENTS ALL TESTS
2. REFERENCE ASTM D1556, DENSITY OF SOIL IN PLACE BY SAND CONE METHOD

LITTLE DELL PROJECT: PL-31 24 MAY 94 NLB

TS	MEAN	STD DEV	≤ 10%	MEDIAN	≥ 90%
	99.5	2.7	95.8	99.7	102.4
	102.1	3.5	97.7	102.4	105.7
	101.5	4.4	95.1	99.3	106.4
	100.7	3.4	96.0	100.5	105.2



WER COMPACTION THAN SHOWN

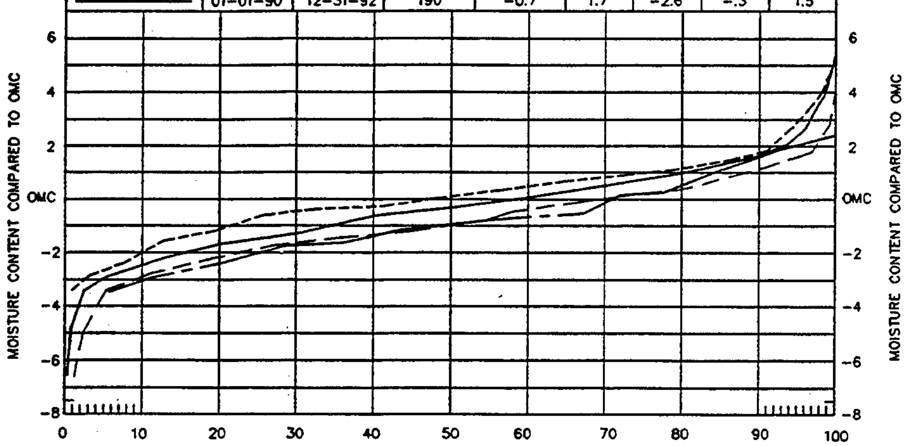
CTION – S-CURVE

NOTES:

① REFERENCE EM 1110-2-1906 AND ASTM D698, STANDARD EFFORT

② REFERENCE ASTM D 1556, DENSITY OF SOIL IN PLACE BY SAND CONE METHOD

YEAR	FROM	TO	# TESTS	MEAN	STD DEV	≤ 10%	MEDIAN	≥ 90%
----------	01-01-92	12-31-92	102	0.2	1.6	-2.0	0	1.7
— — — —	01-01-91	12-31-91	70	-0.9	1.7	-3.1	-1	1.1
—— — —	01-01-90	12-31-90	18	-0.7	1.7	-3.5	-1	1.6
————	01-01-90	12-31-92	190	-0.7	1.7	-2.6	-.3	1.5



PERCENT OF TESTS WITH LESS VARITATION THAN SHOWN

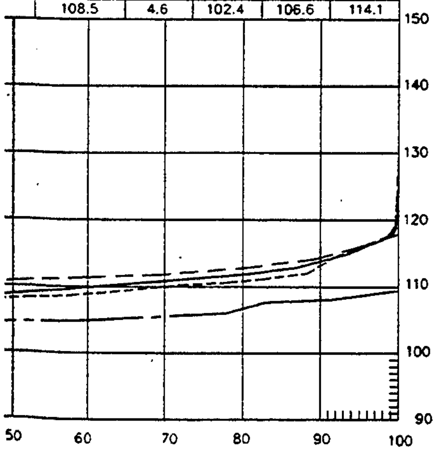
OMC COMPARISON – S-CURVES

NOTES:

① REFERENCE EM 1110-2-1906 AND ASTM D698, STANDARD EFFORT

② REFERENCE ASTM D 1556, DENSITY OF SOIL IN PLACE BY SAND CONE METHOD

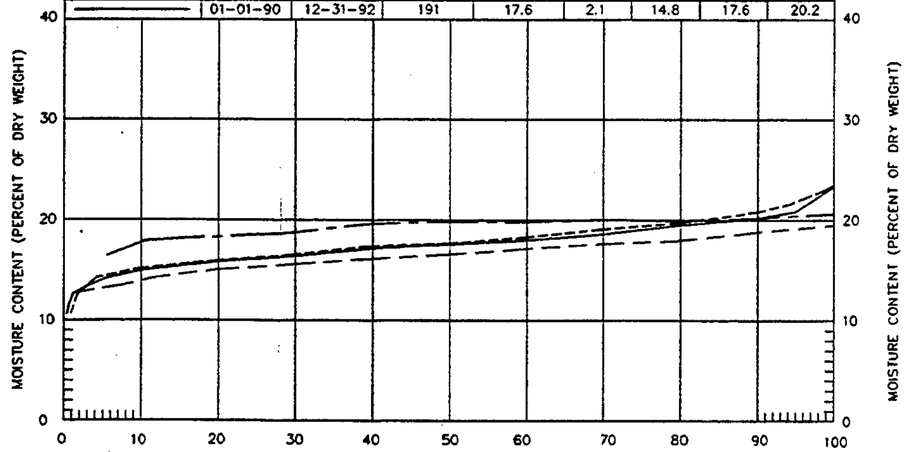
TS	MEAN	STD DEV	≤ 10%	MEDIAN	≥ 90%
	108.2	4.6	102.4	108.2	113.6
	110.1	3.9	105.8	110.7	114.1
	104.0	3.4	97.7	104.4	107.7
	108.5	4.6	102.4	106.6	114.1



LOWER WEIGHT THAN SHOWN

EIGHT – S-CURVE

YEAR	FROM	TO	# TESTS	MEAN	STD DEV	≤ 10%	MEDIAN	≥ 90%
----------	01-01-92	12-31-92	103	18.0	2.3	15.1	17.8	20.8
— — — —	01-01-91	12-31-91	70	16.6	1.6	14.4	16.5	18.7
—— — —	01-01-90	12-31-90	18	19.5	1.0	16.6	19.7	20.2
————	01-01-90	12-31-92	191	17.6	2.1	14.8	17.6	20.2



PERCENT OF TESTS WITH LOWER MOISTURE THAN SHOWN

IN PLACE MOISTURE CONTENT – S-CURVE

LEGEND

④ ---------- 1992
③ — — — — 1991
② —— — — 1990
① ———— 1990, 1991, & 1992

PCF = POUNDS PER CUBIC FOOT
OMC = OPTIMUM MOISTURE CONTENT
SG = SPECIFIC GRAVITY
STD DEV = STANDARD DEVIATION

LITTLE DELL LAKE
SALT LAKE CITY STREAMS, UTAH

EMBANKMENT
IMPERVIOUS CORE CONSTRUCTION PLACEMENT DATA

DEPARTMENT OF THE ARMY
SACRAMENTO DISTRICT, CORPS OF ENGINEERS
SACRAMENTO, CALIFORNIA

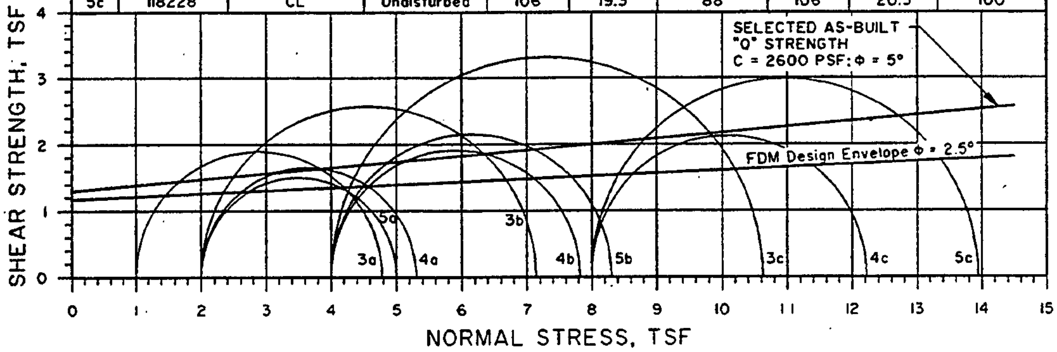
SUBMITTED: MICHAEL D. RAMSBOTHAM

APPROVED: RESIDENT ENGINEER

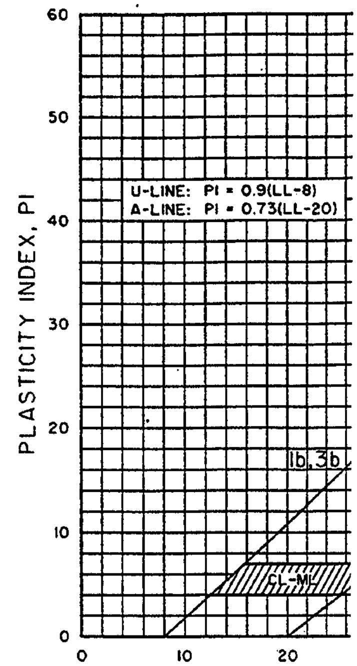
GEB | MDR

PLATE 31

NO.	DIVISION SAMPLE NO.	MATERIAL CLASS. SYMBOL	TYPE OF SAMPLE	PROPERTIES					
				INITIAL			BEFORE SHEAR		
				DRY DENSITY (PCF)	MOISTURE CONTENT (%)	SATURATION (%)	DRY DENSITY (PCF)	MOISTURE CONTENT (%)	SATURATION (%)
3a	117945	CL	Undisturbed	110	18.1	91	110	18.1	91
3b	117946	CL	Undisturbed	111	17.3	88	111	17.3	88
3c	117947	CL	Undisturbed	115	16.1	93	115	16.1	93
4a	118229	CL	Undisturbed	108.5	19.0	96	109.6	19.0	98
4b	118229	CL	Undisturbed	110.2	18.4	97	111.5	18.4	100
4c	118229	CL	Undisturbed	109.8	18.2	94	111.7	19.0	100
5a	118226	CL	Undisturbed	106	18.5	77	106	18.5	100
5b	118227	CL	Undisturbed	110	18.3	93	110	18.1	100
5c	118228	CL	Undisturbed	106	19.3	88	106	20.5	100

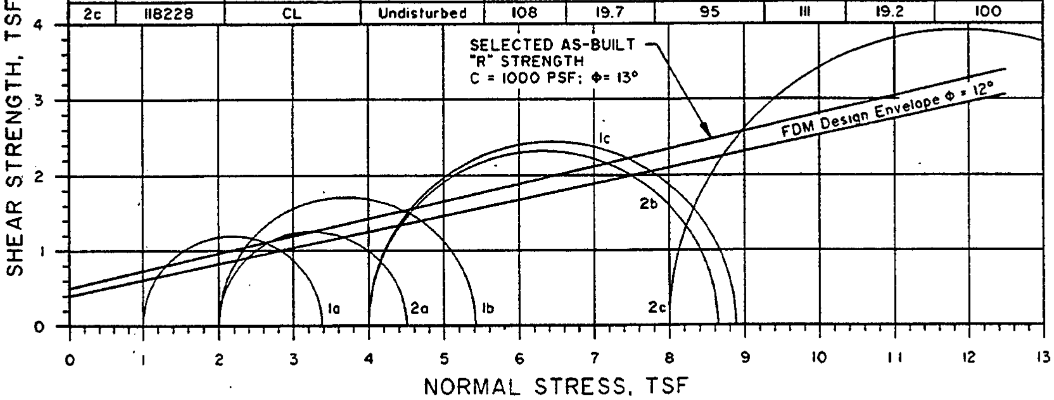


"Q" TRIAXIAL SHEAR STRENGTH (IMPERVIOUS FILL)

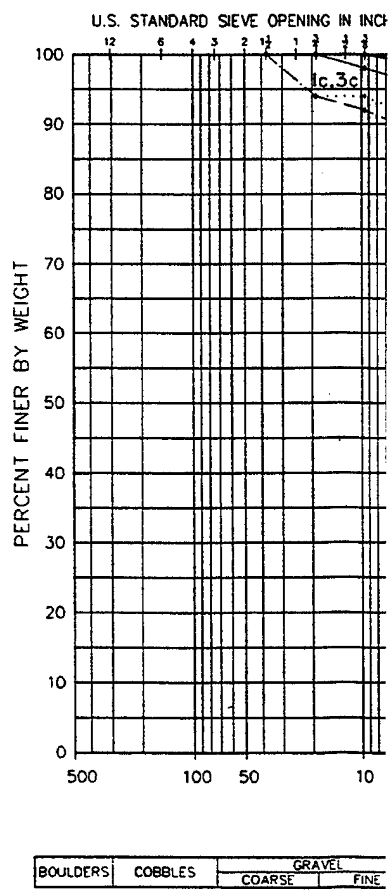


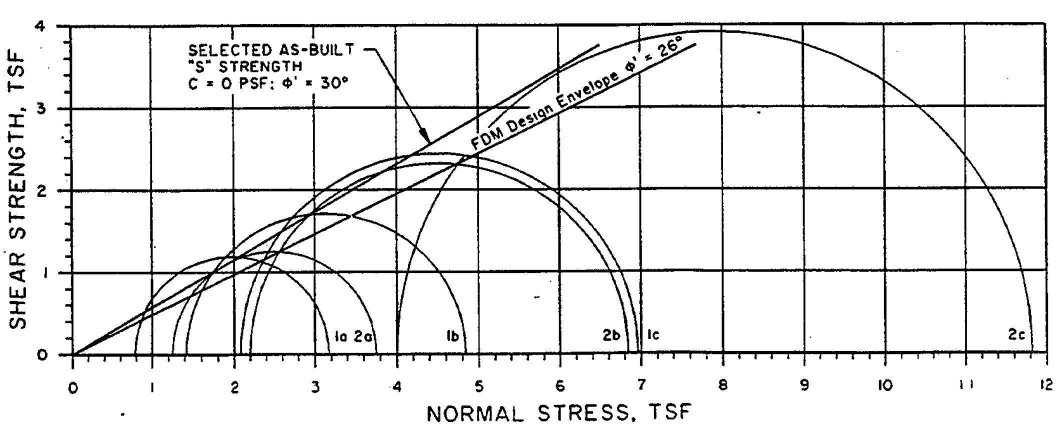
ATTE

NO.	DIVISION SAMPLE NO.	MATERIAL CLASS. SYMBOL	TYPE OF SAMPLE	UNDISTURBED PROPERTIES					
				INITIAL			BEFORE SHEAR		
				DRY DENSITY (PCF)	MOISTURE CONTENT (%)	SATURATION (%)	DRY DENSITY (PCF)	MOISTURE CONTENT (%)	SATURATION (%)
1a	117945	CL	Undisturbed	108	17.9	87	109	20.2	100
1b	117946	CL	Undisturbed	111	17.0	89	113	18.4	100
1c	117947	CL	Undisturbed	112	17.2	90	113	17.8	100
2a	118226	CL	Undisturbed	106	18.2	84	107	20.7	100
2b	118227	CL	Undisturbed	108	19.6	93	110	19.7	100
2c	118228	CL	Undisturbed	108	19.7	95	111	19.2	100



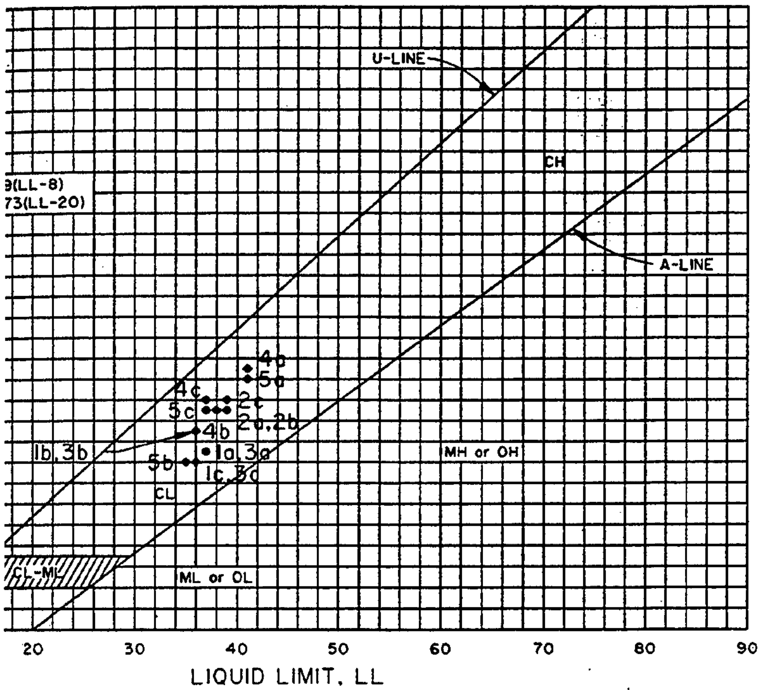
"R̄" TRIAXIAL SHEAR STRENGTH (IMPERVIOUS FILL)



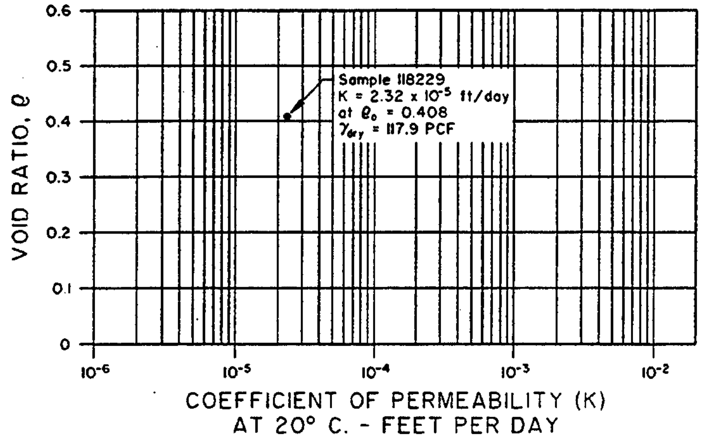


"S" TRIAXIAL SHEAR STRENGTH (IMPERVIOUS FILL)

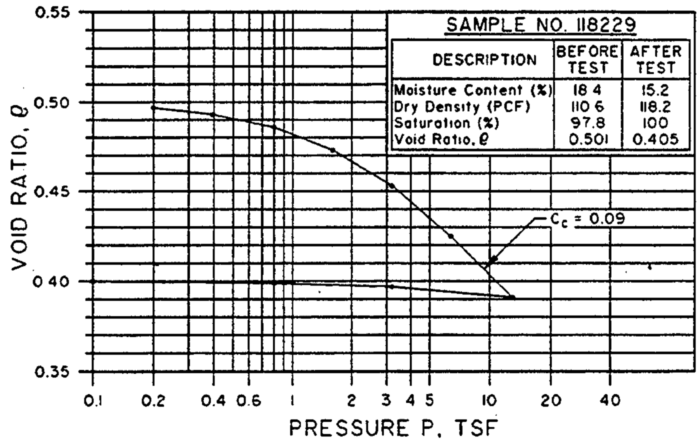
GRADAT



ATTERBERG LIMITS (IMPERVIOUS FILL)



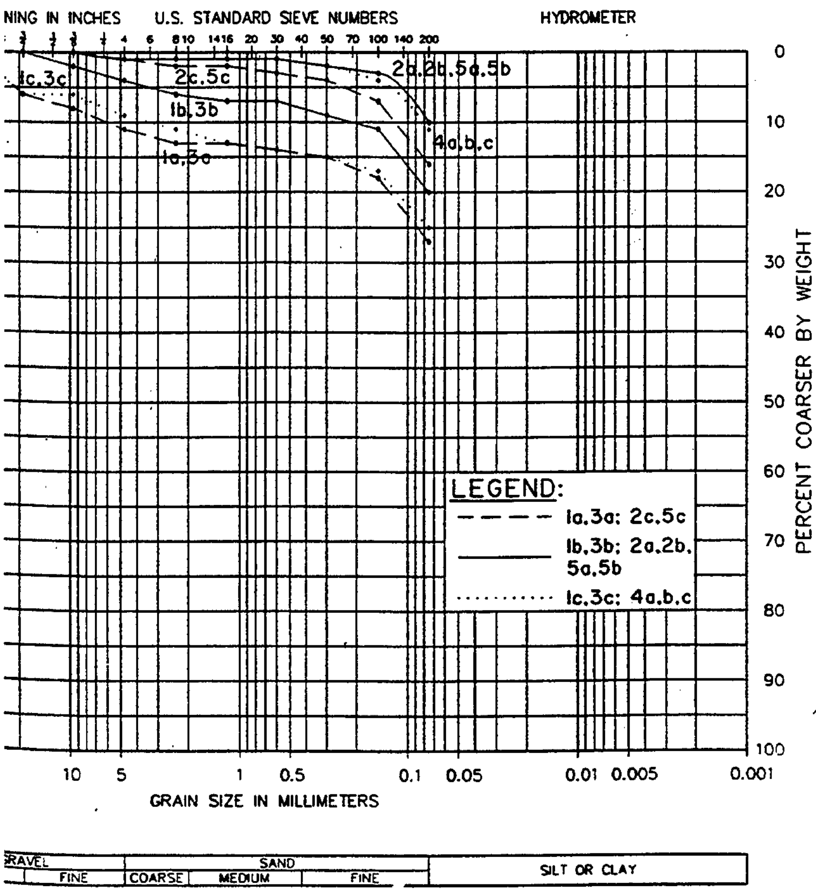
PERMEABILITY TEST DATA (IMPERVIOUS FILL)



SAMPLE NO. 118229

DESCRIPTION	BEFORE TEST	AFTER TEST
Moisture Content (%)	18 4	15.2
Dry Density (PCF)	110 6	118.2
Saturation (%)	97.8	100
Void Ratio, e	0.501	0.405

CONSOLIDATION TEST (IMPERVIOUS FILL)



GRADATION CURVES (IMPERVIOUS FILL)

RECORD SAMPLING DATA
(IMPERVIOUS FILL)

DIVISION SAMPLE NO.	DATE OF SAMPLE	LOCATION STATION	ELEVATION (Feet)	OFFSET
117945	10-13 Aug 91	15+07	5625.0	0'
117946	10-13 Aug 91	15+07	5625.0	0'
117947	10-13 Aug 91	15+07	5625.0	0'
118226	30 Oct - 3 Nov 91	17+50	5670.2	0'
118227	30 Oct - 3 Nov 91	17+50	5670.2	0'
118228	30 Oct - 3 Nov 91	17+50	5670.2	0'
118229	30 Oct - 3 Nov 91	17+50	5670.2	0'

LITTLE DELL LAKE
SALT LAKE CITY STREAMS, UTAH

IMPERVIOUS CORE
RECORD TEST RESULTS

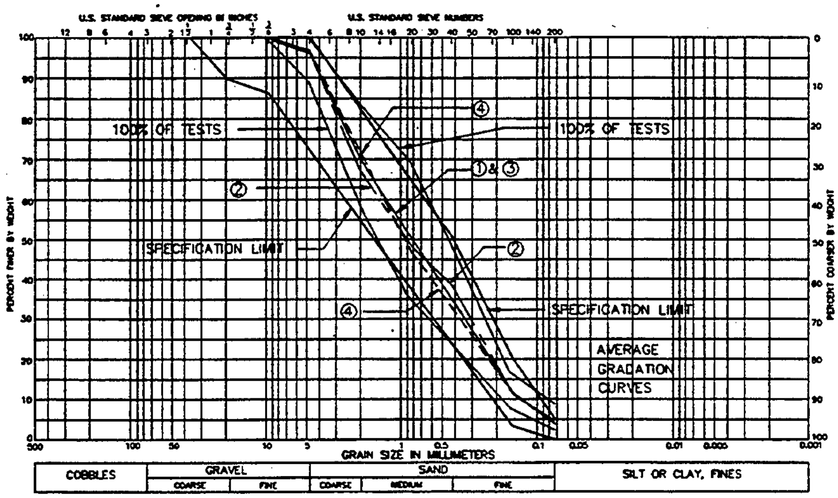
DEPARTMENT OF THE ARMY
SACRAMENTO DISTRICT, CORPS OF ENGINEERS
SACRAMENTO, CALIFORNIA

SUBMITTED: DAVE RICKETTS

SUBMITTED: RESIDENT ENGINEER

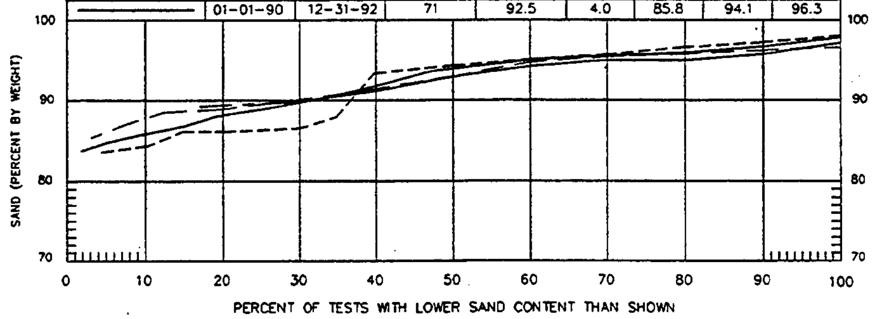
N. BOLAND | D. R.

PLATE 32



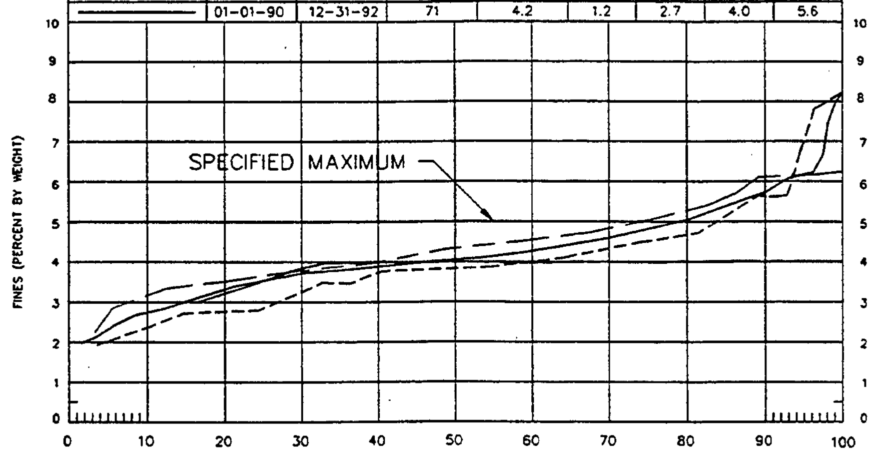
GRADATION CURVES
TRANSITION I

YEAR	FROM	TO	# TESTS	MEAN	STD DEV	≤ 10%	MEDIAN	≥ 90%
- - - - - - - -	01-01-92	12-31-92	28	92.2	5.1	83.9	94.3	97.3
— — — —	01-01-91	12-31-91	37	92.5	3.2	87.8	92.7	95.9
—— – ——	01-01-90	12-31-90	6	93.2	3.1	0	90	95
————	01-01-90	12-31-92	71	92.5	4.0	85.8	94.1	96.3

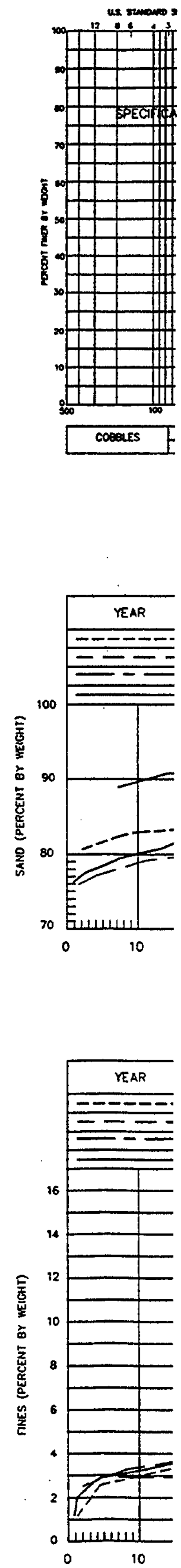


SAND – S-CURVE
TRANSITION I

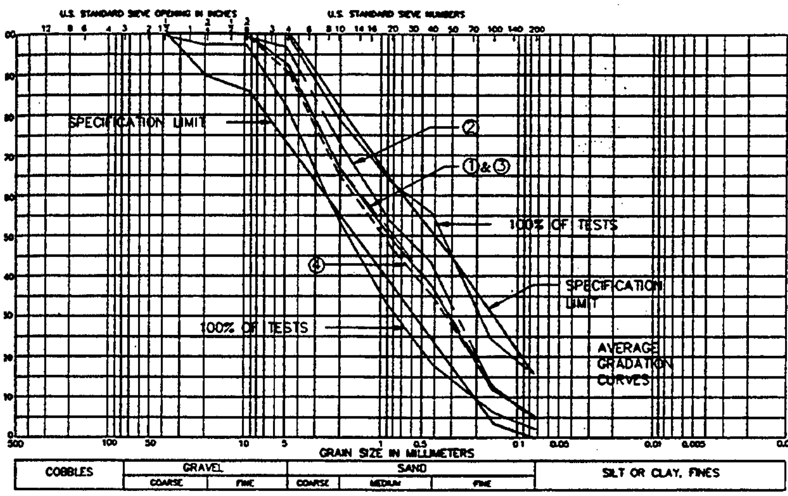
YEAR	FROM	TO	# TESTS	MEAN	STD DEV	≤ 10%	MEDIAN	≥ 90%
- - - - - - - -	01-01-92	12-31-92	28	4.0	1.5	2.1	3.7	5.6
— — — —	01-01-91	12-31-91	37	4.4	1.0	2.9	4.3	6.1
—— – ——	01-01-90	12-31-90	6	3.8	0.4	0	4	4
————	01-01-90	12-31-92	71	4.2	1.2	2.7	4.0	5.6



FINES – S-CURVE
TRANSITION I



LITTLE DELL PROJECT: PL-33 24 MAY 94 NLB

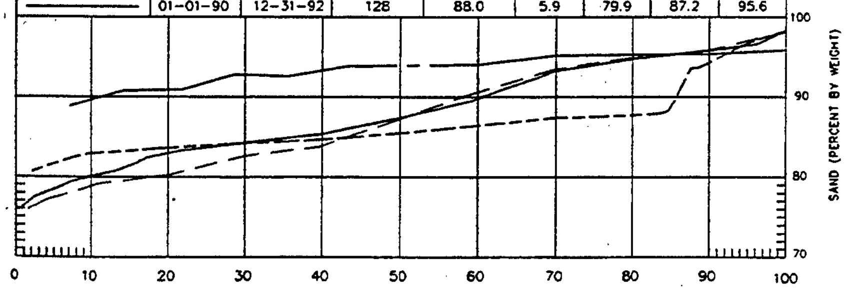


GRADATION CURVES
TRANSITION II

LEGEND

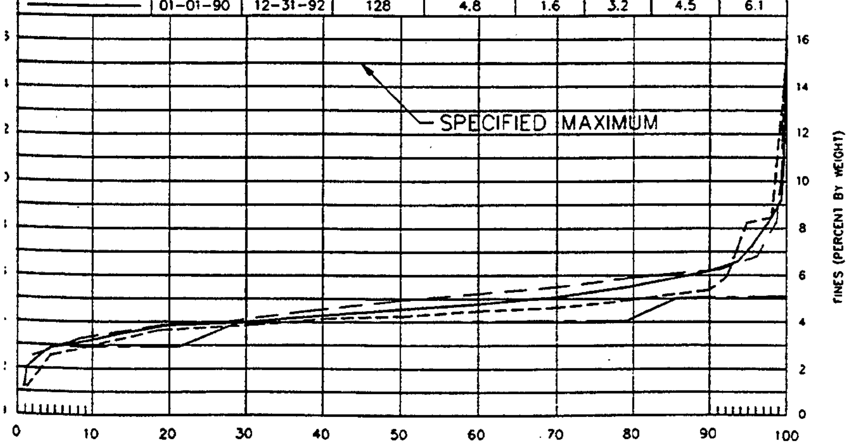
④	-------	1992
③	— — — —	1991
②	—— – ——	1990
①	————	1990, 1991, & 1992
	STD DEV	STANDARD DEVIATION

YEAR	FROM	TO	# TESTS	MEAN	STD DEV	≤ 10%	MEDIAN	≥ 90%
--------	01-01-92	12-31-92	40	86.8	4.2	83.2	86.5	94.2
— — — —	01-01-91	12-31-91	72	87.7	6.6	78.6	86.4	95.6
—— – ——	01-01-90	12-31-90	14	93.5	1.9	89	94	95
————	01-01-90	12-31-92	128	88.0	5.9	79.9	87.2	95.6



SAND – S-CURVE
TRANSITION II

YEAR	FROM	TO	# TESTS	MEAN	STD DEV	≤ 10%	MEDIAN	≥ 90%
--------	01-01-92	12-31-92	40	4.6	1.3	3.2	4.3	5.2
— — — —	01-01-91	12-31-91	72	5.0	1.7	3.4	4.8	6.2
—— – ——	01-01-90	12-31-90	14	4.0	0.7	3	4	5
————	01-01-90	12-31-92	128	4.8	1.6	3.2	4.5	6.1



FINES – S-CURVE
TRANSITION II

LITTLE DELL LAKE
SALT LAKE CITY STREAMS, UTAH

EMBANKMENT
TRANSITION I AND II
CLASSIFICATION TEST RESULTS

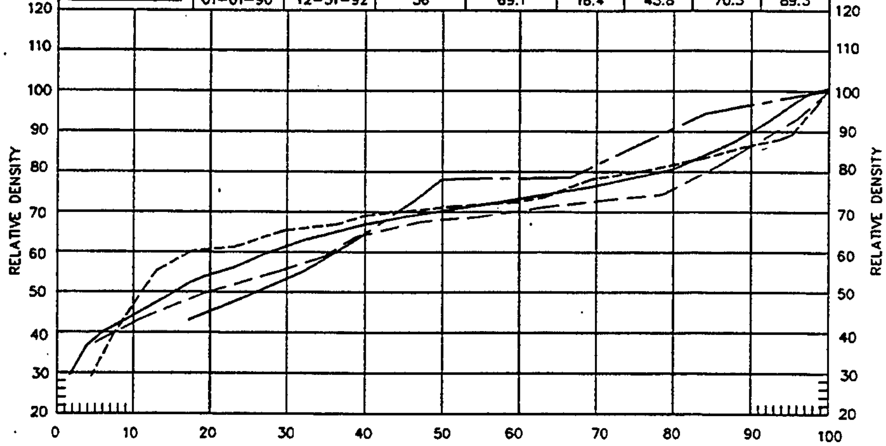
DEPARTMENT OF THE ARMY
SACRAMENTO DISTRICT, CORPS OF ENGINEERS
SACRAMENTO, CALIFORNIA

SUBMITTED:	APPROVED:
MICHAEL D. RAMSBOTHAM	RESIDENT ENGINEER

DR. BY:	CHECKED BY:		
GEB	MDR		PLATE 33

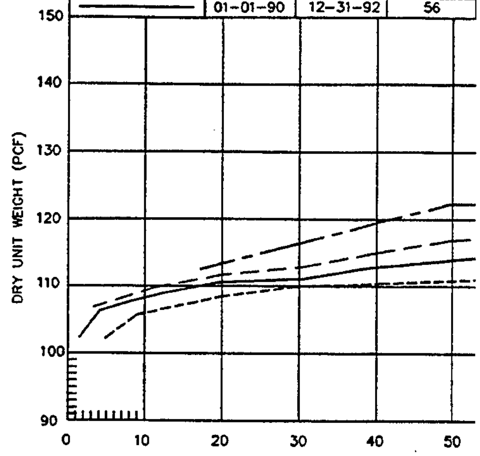
②

YEAR	FROM	TO	# TESTS	MEAN	STD DEV	≤ 10%	MEDIAN	≥ 90%
----------	01-01-92	12-31-92	22	71.0	15.3	44.9	70.4	85.3
— — — — —	01-01-91	12-31-91	28	66.3	16.1	38.2	67.8	84.8
—— - - ——	01-01-90	12-31-90	6	74.9	21.9	0	56.3	93.7
————	01-01-90	12-31-92	56	69.1	16.4	43.8	70.3	89.3



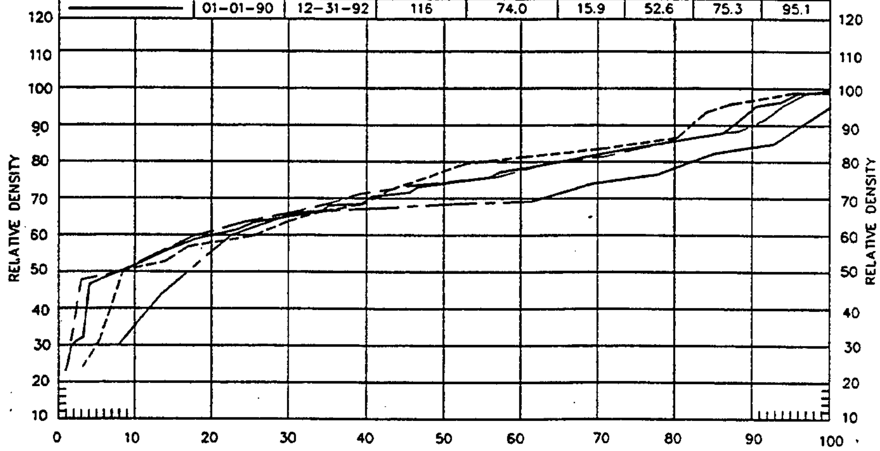
RELATIVE DENSITY – S-CURVE
TRANSITION I

YEAR	FROM	TO	# TESTS
----------	01-01-92	12-31-92	22
— — — — —	01-01-91	12-31-91	28
—— - - ——	01-01-90	12-31-90	6
————	01-01-90	12-31-92	56



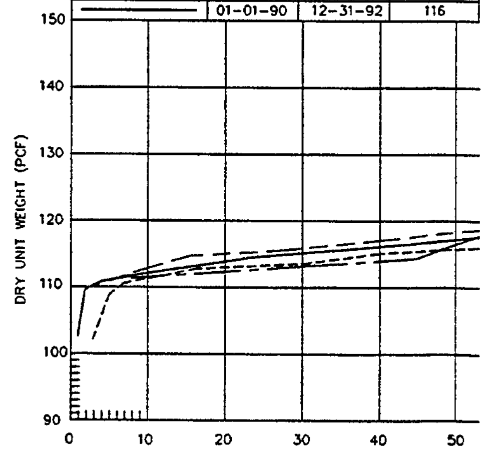
IN PLACE UNIT WEIG
TRANSITI

YEAR	FROM	TO	# TESTS	MEAN	STD DEV	≤ 10%	MEDIAN	≥ 90%
----------	01-01-92	12-31-92	36	74.9	18.6	51.7	78.6	97.3
— — — — —	01-01-91	12-31-91	67	74.4	14.3	53.5	75.3	90.8
—— - - ——	01-01-90	12-31-90	13	69.3	16.5	30.4	69.4	83.0
————	01-01-90	12-31-92	116	74.0	15.9	52.6	75.3	95.1



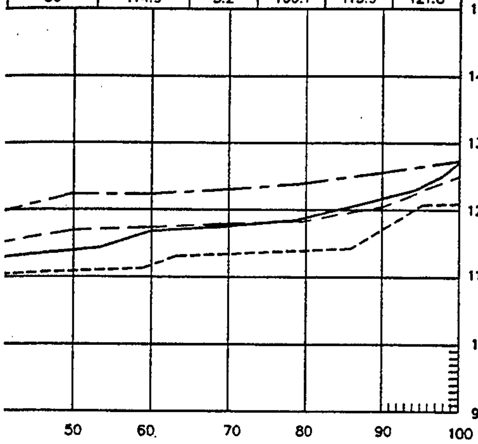
RELATIVE DENSITY – S-CURVE
TRANSITION II

YEAR	FROM	TO	# TESTS
----------	01-01-92	12-31-92	36
— — — — —	01-01-91	12-31-91	67
—— - - ——	01-01-90	12-31-90	13
————	01-01-90	12-31-92	116



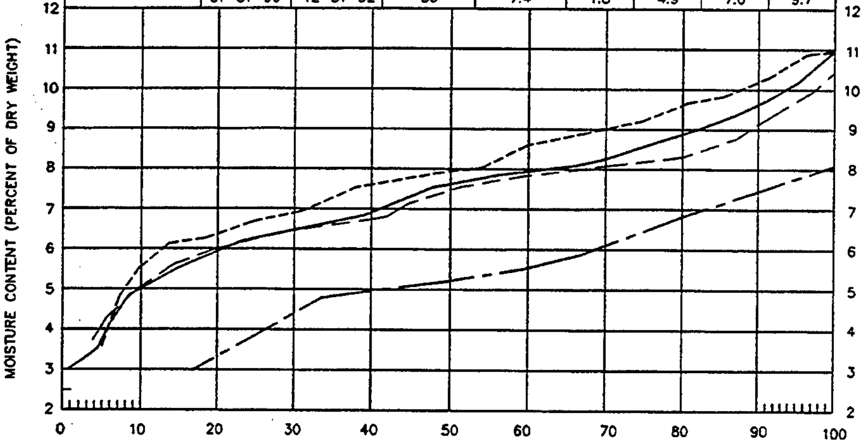
IN PLACE UNIT WEIG
TRANSITI(

# TESTS	MEAN	STD DEV	≤ 10%	MEDIAN	≥ 90%
22	111.8	4.3	105.9	111.1	114.3
28	116.0	4.3	108.2	116.7	120.0
6	121.1	5.4	0	117.7	124.5
56	114.9	5.2	106.1	113.9	121.8



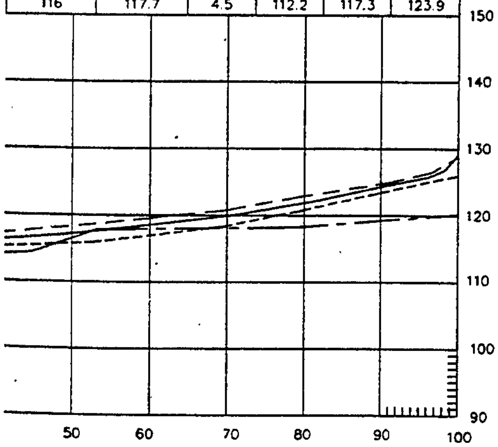
INIT WEIGHT – S-CURVE
TRANSITION I

YEAR	FROM	TO	# TESTS	MEAN	STD DEV	≤ 10%	MEDIAN	≥ 90%
- - - - - - - - -	01-01-92	12-31-92	22	8.0	1.8	5.5	7.9	9.8
— — — — —	01-01-91	12-31-91	28	7.3	1.6	4.9	7.5	9.1
——— — —	01-01-90	12-31-90	6	5.7	1.8	0	4.8	7.1
—————	01-01-90	12-31-92	56	7.4	1.8	4.9	7.6	9.7



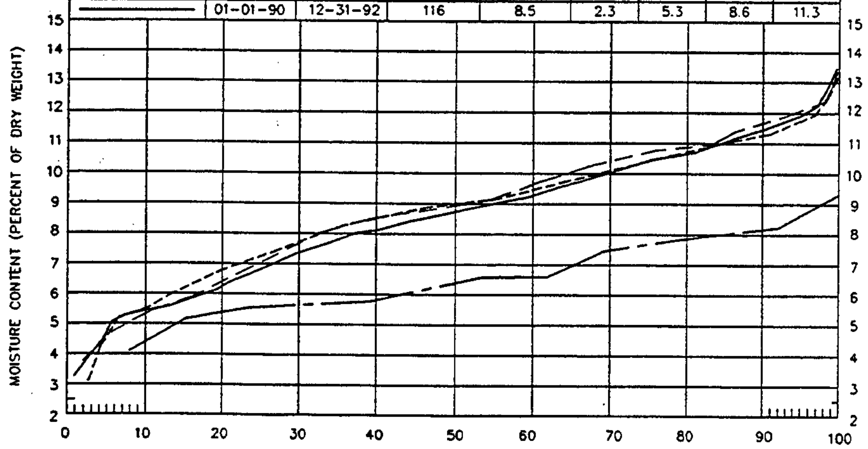
IN PLACE MOISTURE CONTENT – S-CURVE
TRANSITION I

# TESTS	MEAN	STD DEV	≤ 10%	MEDIAN	≥ 90%
36	116.6	4.9	110.9	115.3	123.0
67	118.7	4.4	112.4	118.4	124.8
13	116.0	3.0	111.3	115.0	118.5
116	117.7	4.5	112.2	117.3	123.9



INIT WEIGHT – S-CURVE
TRANSITION II

YEAR	FROM	TO	# TESTS	MEAN	STD DEV	≤ 10%	MEDIAN	≥ 90%
- - - - - - - - -	01-01-92	12-31-92	36	8.7	2.2	5.3	8.8	11.2
— — — — —	01-01-91	12-31-91	67	8.7	2.3	5.4	8.7	11.5
——— — —	01-01-90	12-31-90	13	6.6	1.4	4.0	6.1	7.9
—————	01-01-90	12-31-92	116	8.5	2.3	5.3	8.6	11.3



IN PLACE MOISTURE CONTENT – S-CURVE
TRANSITION II

LEGEND

④ - - - - - - - - - 1992
③ — — — — — 1991
② ——— — — 1990
① ————— 1990, 1991, & 1992

PCF = POUNDS PER CUBIC FOOT
STD DEV = STANDARD DEVIATION

LITTLE DELL LAKE
SALT LAKE CITY STREAMS, UTAH

EMBANKMENT
TRANSITION I AND TRANSITION II
CONSTRUCTION PLACEMENT DATA

DEPARTMENT OF THE ARMY
SACRAMENTO DISTRICT, CORPS OF ENGINEERS
SACRAMENTO, CALIFORNIA

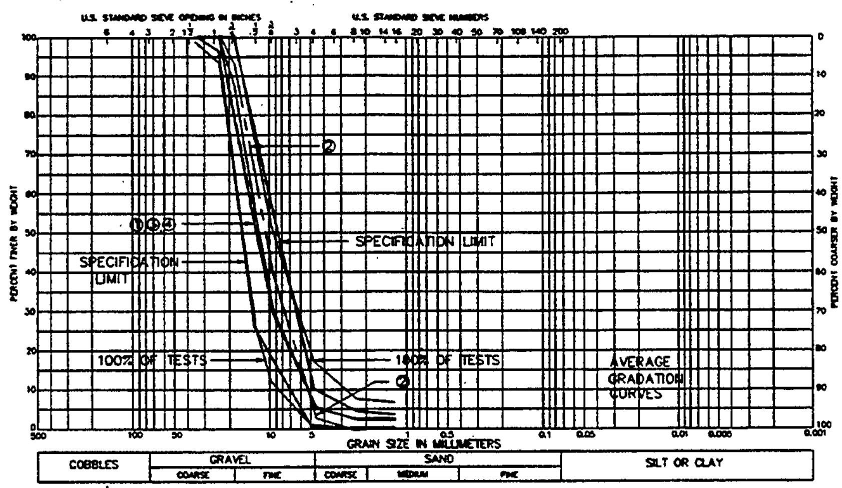
SUBMITTED: MICHAEL D. RAMSBOTHAM

APPROVED: RESIDENT ENGINEER

DR. BY: CEB | CK. BY: MDR

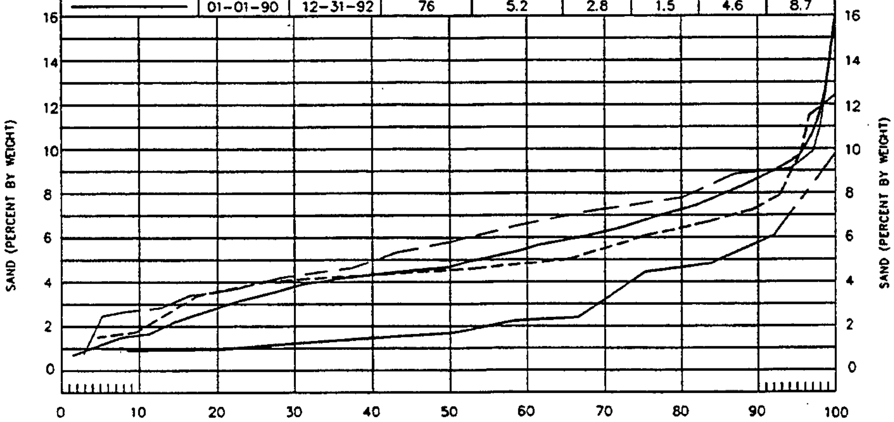
PLATE 34

2



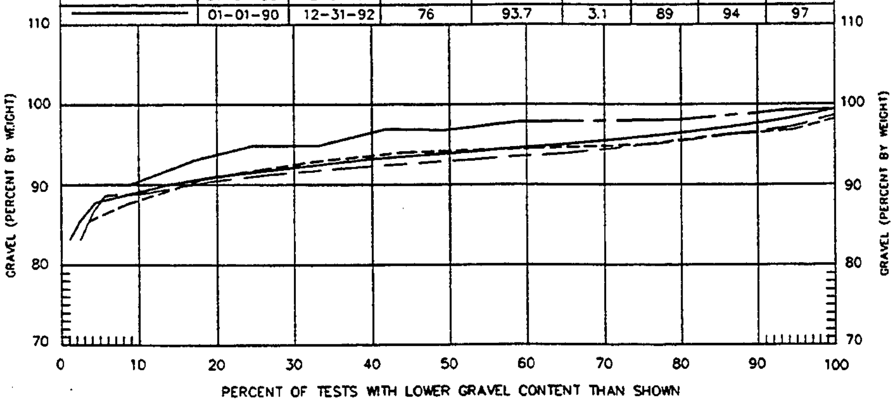
GRADATION CURVES
DRAINAGE FILL I

YEAR	FROM	TO	# TESTS	MEAN	STD DEV	≤ 10%	MEDIAN	≥ 90%
- - - - - - -	01-01-92	12-31-92	27	5.1	2.4	1.6	4.4	7.1
— — — —	01-01-91	12-31-91	37	5.9	2.7	2.7	5.5	8.8
—— – ——	01-01-90	12-31-90	12	3.1	2.7	0.9	1.5	4.7
————	01-01-90	12-31-92	76	5.2	2.8	1.5	4.6	8.7

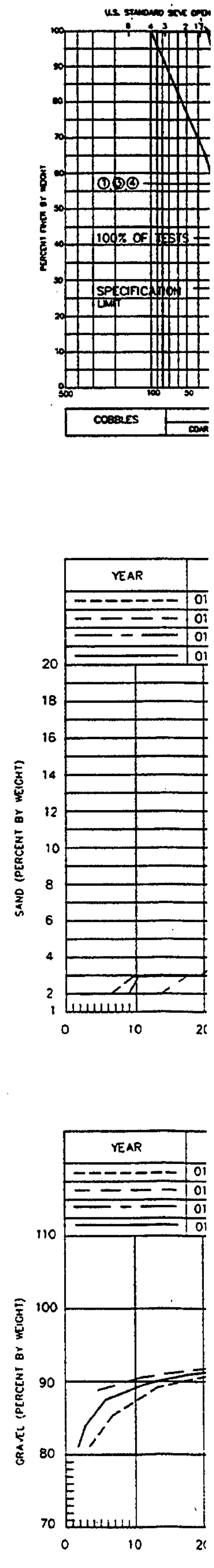


SAND – S-CURVE
DRAINAGE FILL I

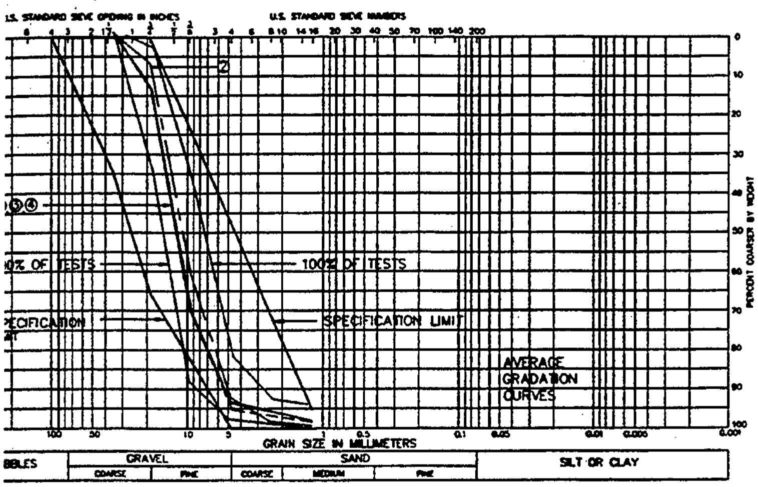
YEAR	FROM	TO	# TESTS	MEAN	STD DEV	≤ 10%	MEDIAN	≥ 90%
- - - - - - -	01-01-92	12-31-92	27	93.5	2.8	88	94	96
— — — —	01-01-91	12-31-91	37	92.9	3.1	89	93	96
—— – ——	01-01-90	12-31-90	12	95.4	2.7	90	97	98
————	01-01-90	12-31-92	76	93.7	3.1	89	94	97



GRAVEL – S-CURVE
DRAINAGE FILL I

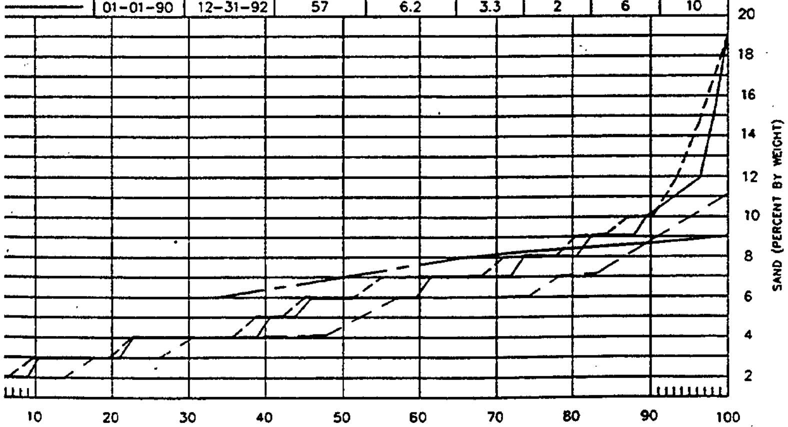


LITTLE DELL PROJECT: PL-35 24 MAY 94 NLB



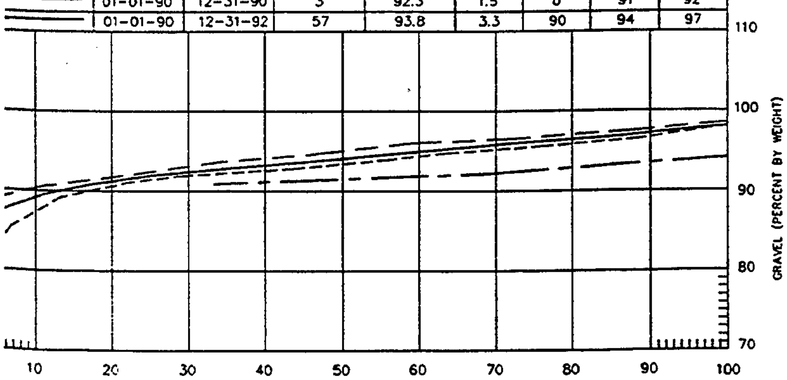
GRADATION CURVES
DRAINAGE FILL II

YEAR	FROM	TO	# TESTS	MEAN	STD DEV	≤ 10%	MEDIAN	≥ 90%
	01-01-92	12-31-92	31	6.6	3.8	3	6	10
	01-01-91	12-31-91	23	5.3	2.5	2	4	8
	01-01-90	12-31-90	3	7.7	1.5	0	6	8
	01-01-90	12-31-92	57	6.2	3.3	2	6	10



SAND – S-CURVE
DRAINAGE FILL II

YEAR	FROM	TO	# TESTS	MEAN	STD DEV	≤ 10%	MEDIAN	≥ 90%
	01-01-92	12-31-92	31	93.3	3.8	88	93	97
	01-01-91	12-31-91	23	94.7	2.5	90	94	97
	01-01-90	12-31-90	3	92.3	1.5	0	91	92
	01-01-90	12-31-92	57	93.8	3.3	90	94	97



GRAVEL – S-CURVE
DRAINAGE FILL II

LEGEND

④ 1992
③ 1991
② 1990
① 1990, 1991, & 1992
STD DEV STANDARD DEVIATION

LITTLE DELL LAKE
SALT LAKE CITY STREAMS, UTAH

EMBANKMENT
DRAINAGE FILL I AND II
CLASSIFICATION TEST RESULTS

DEPARTMENT OF THE ARMY
SACRAMENTO DISTRICT, CORPS OF ENGINEERS
SACRAMENTO, CALIFORNIA

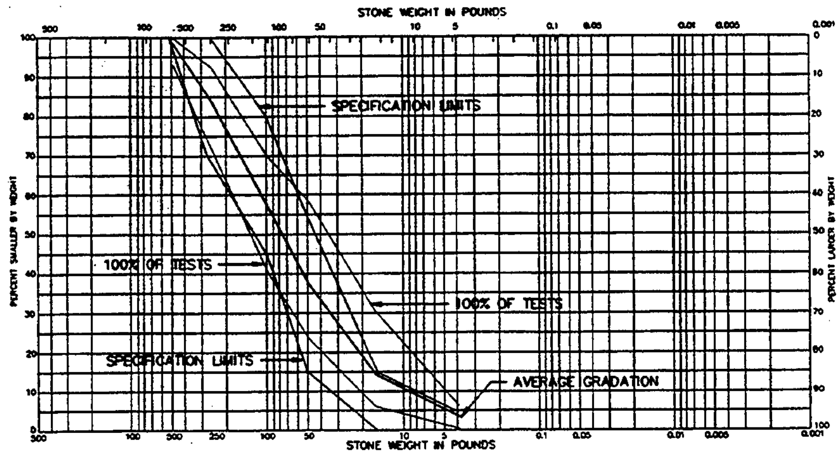
SUBMITTED
MICHAEL D. RAMSBOTHAM

APPROVED:
RESIDENT ENGINEER

DR. BY CEB
CHECKED BY MDR

PLATE 35

2



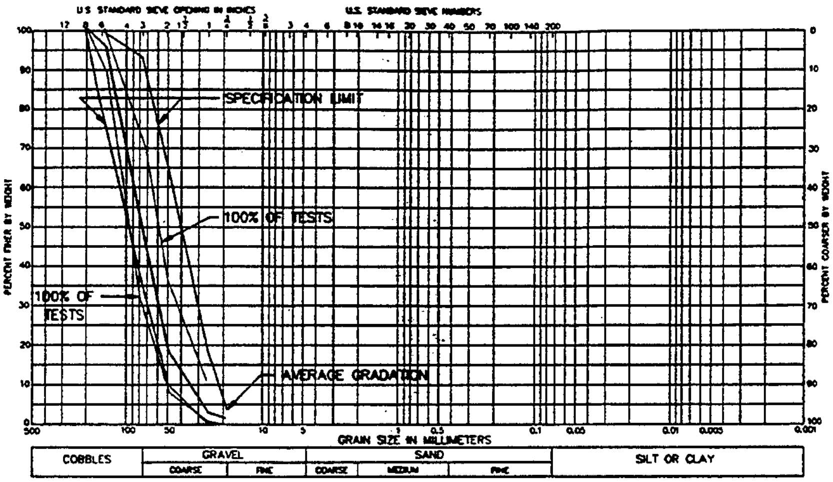
RIPRAP I – GRADATION CURVES

TEST	TEST METHOD	RIPRAP I & BEDDING REQUIREMENTS	PEOA QUARF PRE–BID STUDY
SPECIFIC GRAVITY (BULK SSD)	ASTM C127	2.4 MINIMUM	2.62
ABSORPTION	ASTM C127	5.0% MAXIMUM	1.8%
WETTING AND DRYING	SPD TEST PROCEDURE (NOTE 1)	NO FRACTURING (NOTE 2)	PASSED
ABRASION LOSS	ASTM C535	50% MAXIMUM	25.6%
MAGNESIUM SULFATE	ASTM C88	25% MAXIMUM	9.0%
FREEZE/THAW	CRD C144	(NOTE 3)	PASSED

NOTES:

1. TEST PROCEDURE WETTING–AND–DRYING TESTS: THE INITIAL STEP OF THE TES SELECTION OF REPRESENTATIVE TEST SPECIMENS. THE PIECE SHOULD BE LARG WITH A MINIMUM SURFACE AREA OF 30 SQUARE INCHES ON ONE SIDE. TWO CI EN. THE SLABS AND CHUNKS ARE CAREFULLY EXAMINED UNDER A LOW–POWEI AND RECORDED. THE SPECIMENS ARE THEN OVEN DRIED AT 140 DEGREES F., I OF A GRAM. THE TEST SPECIMENS ARE PHOTOGRAPHED TO SHOW ALL SURFAC THEN SUBJECTED TO FIFTEEN CYCLES OF WETTING AND DRYING. ONE SLAB AN OTHER SLAB AND CHUNK ARE SOAKED IN SALT WATER PREPARED IN ACCORDAI SIXTEEN HOURS AT ROOM TEMPERATURE AND DRYING IN AN OVEN FOR EIGHT H ARE EXAMINED WITH THE LOW–POWER MICROSCOPE TO CHECK FOR OPENING OR CLAYS, SOFTENING OF ROCK SURFACES, HEAVING OF MICACEOUS MINERALS, THI OTHER EVIDENCE OF WEAKNESS DEVELOPING IN THE ROCK CYCLE IN WHICH AN CLES THE SLABS AND CHUNKS ARE AGAIN CAREFULLY EXAMINED, AND CHANGE TOGETHER WITH ALL FLAKES OR PARTICLES WHICH COME OFF DURING THE TEST
2. WEAKENING AND MINOR LOSS OF INDIVIDUAL SURFACE PARTICLES ARE PERMISSI CAUSES GENERAL DISINTEGRATION OF THE MATERIAL.
3. RESULTS OF THIS TEST WILL BE USED AS A BASIS TO DISQUALIFY THE MATERI ING OF THE MATERIAL OCCURS.

LITTLE DELL PROJECT: PL–36 24 MAY 94 NLB



RIPRAP I BEDDING – GRADATION CURVES

A QUARRY PRE-BID STUDY	PEOA QUARRY AUG 92 SAMPLE	PEOA QUARRY AUG 92 SAMPLE	LITTLE DELL BORROW AREA JUNE 1990 SAMPLES	
			QUARTZITE	SANDSTONE
2.62	2.53	--	2.59	2.54
1.8%	2.0%	--	0.12%	0.66%
PASSED	PASSED	--	PASSED	FAILED
25.6%	46.0%	24.0%	10.8%	10.8%
9.0%	30.2%	--	0.7%	0.7%
PASSED	FAILED	PASSED	PASSED	PASSED

F THE TEST IS THE CAREFUL EXAMINATION OF THE ENTIRE SAMPLE AND
) BE LARGE ENOUGH TO PRODUCE TWO CUT SLABS 1 INCH THICK (± 1/4")
:. TWO CHUNKS APPROXIMATELY THREE BY FOUR INCHES ARE ALSO CHOS-
.OW-POWER MICROSCOPE, AND ALL VISIBLE SURFACE FEATURES ARE NOTED
3REES F., FOR EIGHT HOURS, COOLED AND WEIGHED TO THE NEAREST TENTH
.L SURFACE FEATURES BEFORE THE TEST. THE CHUNKS AND SLABS ARE
: SLAB AND ONE CHUNK ARE SOAKED IN FRESH TAP WATER, AND THE
ACCORDANCE WITH ASTM D 1141. EACH CYCLE CONSISTS OF SOAKING FOR
)R EIGHT HOURS AT 140 DEGREES F. AFTER EACH CYCLE THE SPECIMENS
PENING OR MOVEMENT OF FRACTURES, FLAKING ALONG EDGES, SWELLING OF
:RALS, THE BREAKDOWN OF MATRIX MATERIAL, DELAMINATION AND ANY
WHICH ANY OF THESE ACTIONS OCCURS IS RECORDED. AFTER FIFTEEN CY-
D CHANGES IN ROCKS ARE NOTED AND RECORDED. THE TEST SPECIMENS
THE TEST ARE OVEN DRIED, WEIGHED AND PHOTOGRAPHED.

: PERMISSIBLE UNLESS BOND OF THE SURFACE GRAINS SOFTENS AND

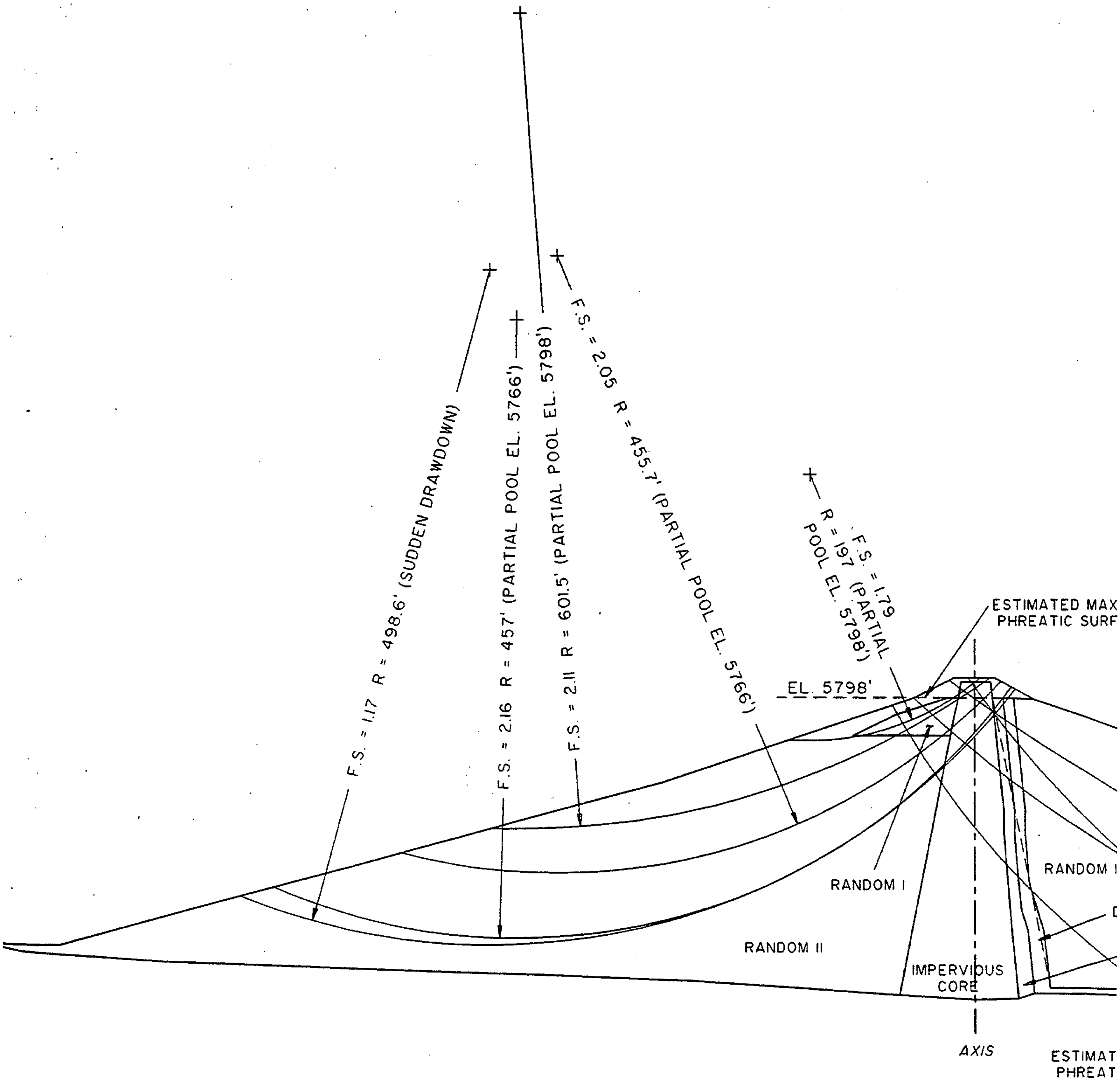
IE MATERIAL ONLY IF A SIGNIFICANT BREAKDOWN, DISINTEGRATION OR SPALL-

LITTLE DELL LAKE
SALT LAKE CITY STREAMS, UTAH

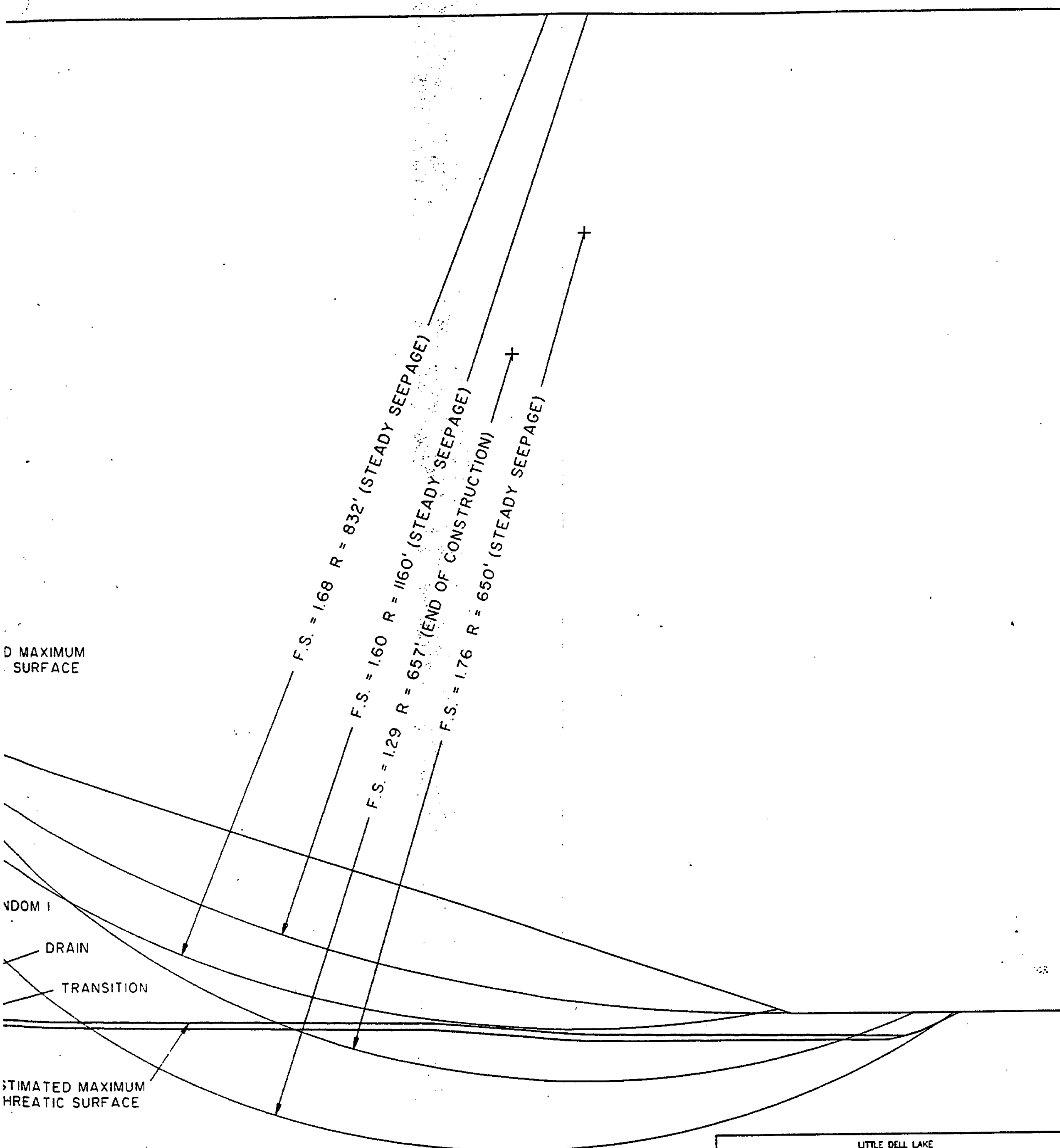
EMBANKMENT
RIPRAP I AND BEDDING TEST RESULTS

DEPARTMENT OF THE ARMY
SACRAMENTO DISTRICT, CORPS OF ENGINEERS
SACRAMENTO, CALIFORNIA

SUBMITTED: MICHAEL D. RAMSBOTHAM		APPROVED: RESIDENT ENGINEER
DR. BY GEB	CHECKED BY MDR	PLATE 36


F.S. = 1.17 R = 498.6' (SUDDEN DRAWDOWN)
F.S. = 2.16 R = 457' (PARTIAL POOL EL. 5766')
F.S. = 2.11 R = 601.5' (PARTIAL POOL EL. 5798')
F.S. = 2.05 R = 455.7' (PARTIAL POOL EL. 5766')
F.S. = 1.79
R = 197 (PARTIAL
POOL EL. 5798')
ESTIMATED MAX
PHREATIC SURF
EL. 5798'
RANDOM I
RANDOM I
RANDOM II
IMPERVIOUS
CORE
AXIS
ESTIMAT
PHREAT

G



LITTLE DELL LAKE
SALT LAKE CITY STREAMS, UTAH

STABILITY ANALYSIS RESULTS
MAXIMUM VALLEY SECTION – STA. 14+50

DEPARTMENT OF THE ARMY
SACRAMENTO DISTRICT, CORPS OF ENGINEERS
SACRAMENTO, CALIFORNIA

SUBMITTED: DAVE RICKETTS

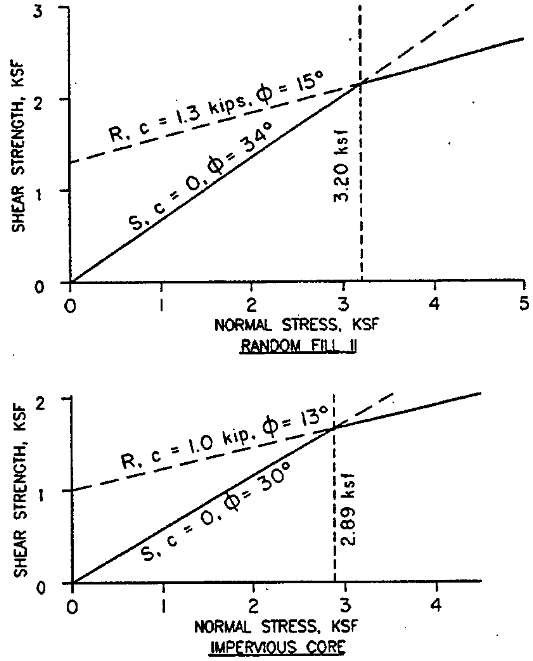
SUBMITTED: RESIDENT ENGINEER

R. BRADLEY | D. R.

PLATE 37

2

SLICE NO.	SEGMENT NO.	SEGMENT AREA (sq. ft.)	SOIL UNIT WEIGHT (pcf)			SEGMENT WEIGHT (kips)			SLICE WEIGHT (kips)	
			MOIST	SATURATED	SUBMERGED	MOIST	SATURATED	SUBMERGED	Before Drawdown	After Drawdown
1	1	16.5	137	–	–	2.3	–	–	2.3	2.3
2	2a	27.4	130	–	–	3.6	–	–	12.3	12.3
	2b	63.7	137	–	–	8.7	–	–		
3	3a	83.5	–	136	73.6	–	11.4	6.1	19.3	24.6
	3b	3.5	130	–	–	0.4	–	–		
	3c	93.7	137	–	–	12.8	–	–		
4	4a	1068.8	–	130	67.6	–	138.9	72.2	168.7	255.2
	4b	283.2	128	–	–	36.2	–	–		
	4c	14.0	–	136	73.6	–	1.9	1.0		
	4d	273.4	137	–	–	37.5	–	–		
	4e	1.8	–	140	77.6	–	0.3	0.1		
	4f	228.8	–	133	70.6	–	30.4	16.2		
	4g	71.4	–	140	77.6	–	10.0	5.5		
5	5a	3644.9	–	140	77.6	–	510.3	282.8	411.6	735.2
	5b	1000.7	–	133	70.6	–	133.1	70.7		
	5c	541.0	–	140	77.6	–	75.7	42.0		
	5d	117.3	137	–	–	16.1	–	–		
6	6	4081.4	–	140	77.6	–	571.4	316.7	316.7	571.4
7	7a	1458.0	–	–	77.6	–	–	113.1	667.9	1114.1
	7b	7149.9	–	140	77.6	–	1001.0	554.8		
8	8a	3481.1	–	–	77.6	–	–	270.1	660.0	973.5
	8b	5024.3	–	140	77.6	–	703.4	389.9		
9	9a	4294.6	–	–	77.6	–	–	333.3	581.8	781.7
	9b	3202.6	–	140	77.6	–	448.4	248.5		
10	10a	3971.9	–	–	77.6	–	–	308.2	416.2	503.1
	10b	1391.9	–	140	77.6	–	194.9	108.0		
11	11a	2000.3	–	–	77.6	–	–	155.2	160.3	164.3
	11b	65.4	–	140	77.6	–	9.1	5.1		



COMPOSITE STRENGTH ENVELOPES
Scale: 1" = 2 KSF

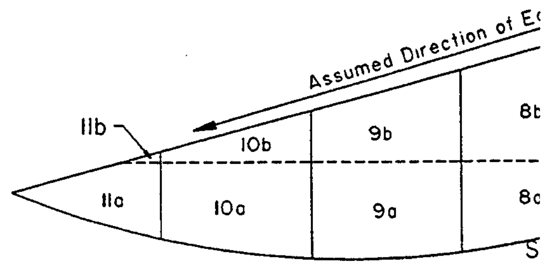
Computation of Factor of Safety – Sudden Drawdown

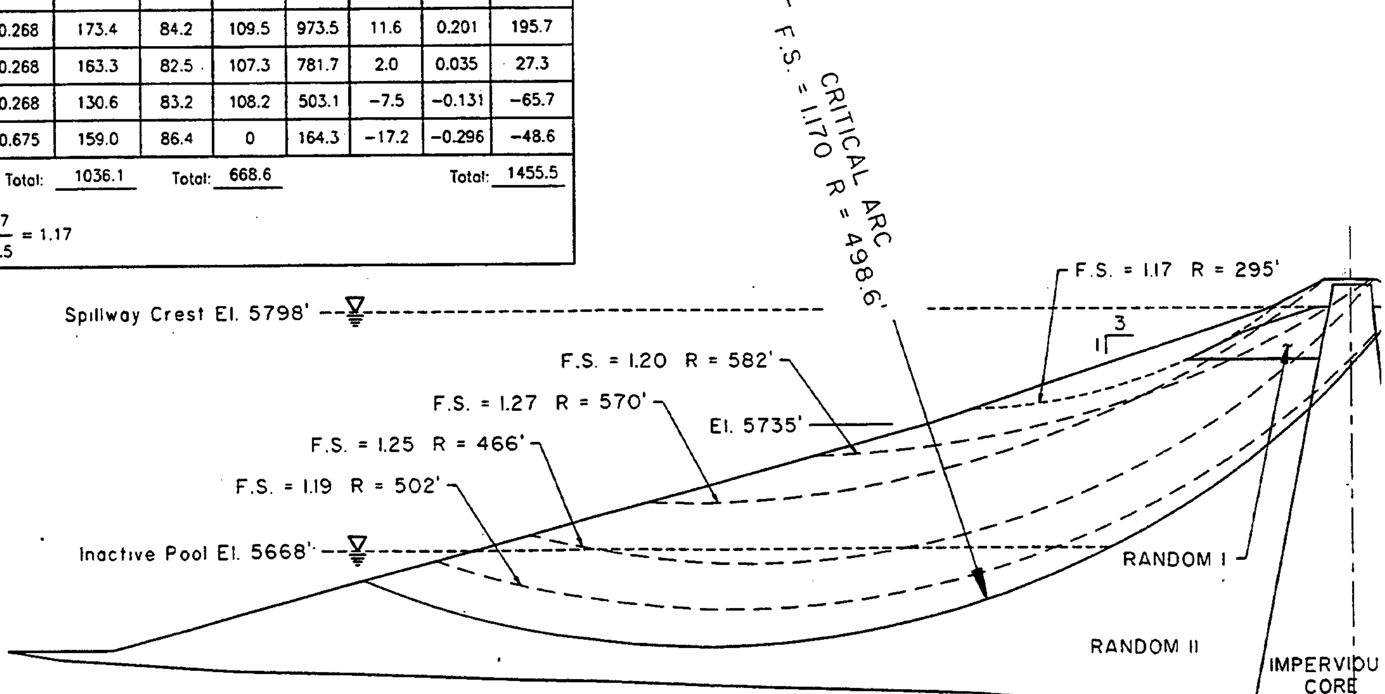
$$F.S. = \frac{\Sigma (N_D \tan \phi + c\,\Delta L)}{\Sigma W \sin \Theta}$$

Where: N_D = Normal Effective Force Before Drawdown
W = Slice Weight After Drawdown

Slice	N_D (kips)	tan Φ	N_D tan Φ	Base Length ΔL (ft.)	c ΔL (kips)	W (kips)	Θ (deg.)	sin Θ	W sin Θ (kips)
1	2.2	0.675	1.5	6.9	0	2.3	51.1	0.778	1.8
2	11.5	0.727	8.4	10.5	0	12.3	50.1	0.767	9.4
3	18.4	0.625	11.5	10.9	0	24.6	48.9	0.754	18.5
4	160.5	0.231	37.1	54.3	54.3	255.2	45.2	0.710	181.1
5	383.5	0.268	102.8	85.0	110.5	735.2	37.2	0.605	444.5
6	296.1	0.268	79.3	48.8	63.5	571.4	29.5	0.492	281.4
7	631.4	0.2687	169.2	88.7	115.3	1114.1	21.6	0.368	410.1
8	647.0	0.268	173.4	84.2	109.5	973.5	11.6	0.201	195.7
9	609.5	0.268	163.3	82.5	107.3	781.7	2.0	0.035	27.3
10	487.5	0.268	130.6	83.2	108.2	503.1	–7.5	–0.131	–65.7
11	235.7	0.675	159.0	86.4	0	164.3	–17.2	–0.296	–48.6
		Total:	1036.1	Total:	668.6			Total:	1455.5

$$F.S. = \frac{1704.7}{1455.5} = 1.17$$





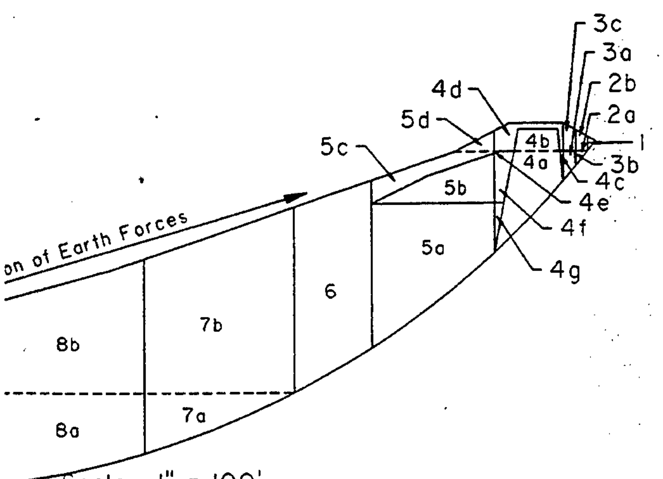
Note: Infinite Slope Factor of Safety above El. 5735' = 1.12

Scale: 1" = 100'

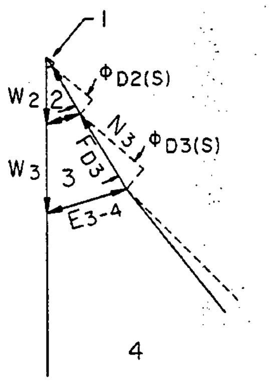
AXIS

$$F.S. = \frac{\gamma_s - \gamma_b}{\gamma_s} \times \tan\phi' \times b = \frac{140 - 62.4}{140} \times \tan 34° \times 3 = 1.12$$

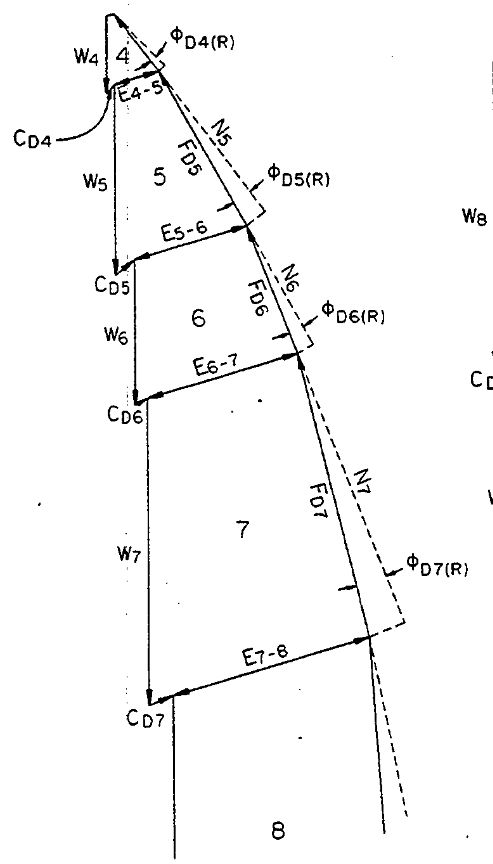
SELECTED DESIGN DATA										
MATERIAL	UNIT WEIGHT (pcf)		S-STRENGTH				R-STRENGTH			
	γ_m -Moist	γ_s -Saturated	Φ (deg.)	COHESION, c (kips/sq. ft.)	Φ_D (deg.)	$C_D/\Delta L$ (psf)	Φ (deg.)	COHESION, c (kips/sq. ft.)	Φ_D (deg.)	$C_D/\Delta L$ (psf)
RANDOM FILL II	137	140	34	0	18.47	0	15	1.3	7.56	643.6
DRAINAGE FILL	130	138	36	0	19.78	0	36	0	–	0
TRANSITION FILL	127	136	32	0	17.19	0	32	0	–	0
IMPERVIOUS CORE	128	130	30	0	15.95	0	13	1.0	6.52	495.1

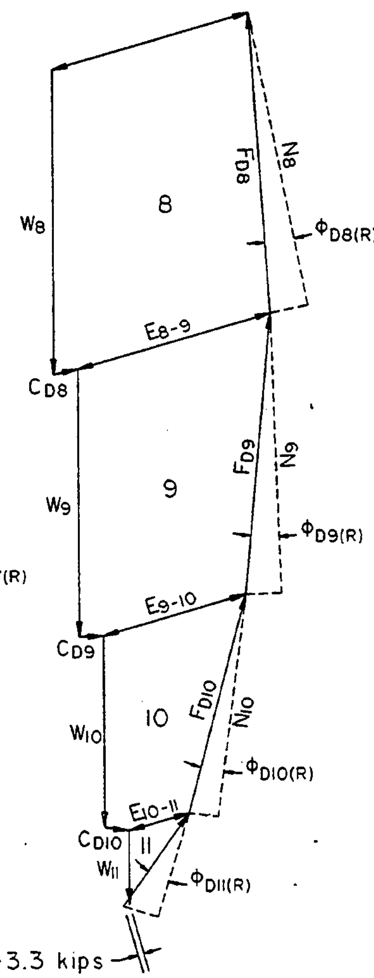


Scale: 1" = 100'



Scale: 1" = 40 kips

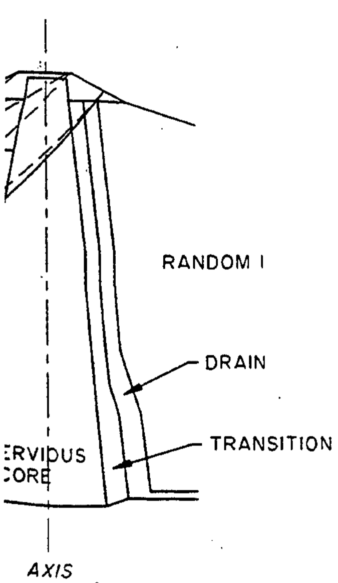




Error of Closure: -3.3 kips

Scale: 1" = 400 kips

Scale: 1" = 400 kips



LITTLE DELL LAKE
SALT LAKE CITY STREAMS, UTAH

STABILITY ANALYSIS
SUDDEN DRAWDOWN

DEPARTMENT OF THE ARMY
SACRAMENTO DISTRICT, CORPS OF ENGINEERS
SACRAMENTO, CALIFORNIA

SUBMITTED: DAVE RICKETTS

SUBMITTED: RESIDENT ENGINEER

DRAWN BY: R. BRADLEY | CHECKED BY: D. R.

PLATE 38

SLICE NO.	SEGMENT NO.	SEGMENT AREA (sq. ft.)	SOIL UNIT WEIGHT (pcf) MOIST	SOIL UNIT WEIGHT (pcf) SUB-MERGED	SEGMENT WEIGHT (kips)	SLICE WEIGHT (kips)	BASE LENGTH OF SLICE, ΔL (ft.)	c·ΔL (kip-ft.)	F.S. = 1.29: $\frac{c \cdot \Delta L}{F.S.}$ (kip-ft.)	F.S. = 1.29: Φ_D (deg.)
1	1a	301.2	137	-	41.3	161.8	64.6	128.4	99.6	10.2
	1b	580.1	130	-	75.4					
	1c	329.6	137	-	45.2					
2	2a	3708.7	128	-	474.7	643.3	76.4	198.6	154.1	3.9
	2b	97.6	137	-	133.7					
	2c	252.9	130	-	328.8					
	2d	395.9	137	-	542.4					
	2e	509.6	127	-	64.7					
	2f	26.3	130	-	3.4					
3	3a	71.0	137	-	9.7	148.1	12.8	0	0	25.9
	3b	44.4	130	-	5.8					
	3c	554.0	130	-	72.0					
	3d	477.4	127	-	60.6					
4	4a	34.3	137	-	4.7	155.2	12.6	0	0	29.4
	4b	676.7	130	-	88.0					
	4c	480.7	130	-	62.5					
5	5a	3.7	137	-	0.5	931.1	63.8	127.6	99.0	10.2
	5b	7158.6	130	-	930.6					
6	6	8253.3	130	-	1072.9	1072.9	58.8	117.6	91.2	10.2
7	7a	1262.7	130	-	164.2	166.2	8.3	0	0	29.4
	7b	15.5	130	-	2.0					
8	8a	8678.1	130	-	1128.2	1203.9	57.9	115.8	89.8	7.0
	8b	227.6	130	-	29.6					
	8c	736.7	-	62.6	46.1					
9	9a	7875.3	130	-	1023.8	1180.0	55.2	110.4	85.6	7.0
	9b	235.8	130	-	30.7					
	9c	2006.0	-	62.6	125.6					
10	10a	7072.4	130	-	919.4	1138.9	53.2	106.4	82.5	7.0
	10b	244.1	130	-	31.7					
	10c	2999.0	-	62.6	187.7					
11	11a	6275.8	130	-	815.8	1082.5	51.8	103.6	80.4	7.0
	11b	249.8	130	-	32.5					
	11c	3741.4	-	62.6	234.2					
12	12a	5492.5	130	-	714.0	1012.5	50.8	101.6	78.8	7.0
	12b	250.0	130	-	32.5					
	12c	4248.2	-	62.6	265.9					
13	13a	4765.6	130	-	619.5	932.7	50.2	100.4	77.9	7.0
	13b	250.0	130	-	32.5					
	13c	4483.6	-	62.6	280.7					
14	14a	4139.0	130	-	538.1	846.7	50.0	100.0	77.6	7.0
	14b	250.0	130	-	32.5					
	14c	4410.9	-	62.6	276.1					
15	15a	3488.3	130	-	453.5	746.1	50.1	100.2	77.7	7.0
	15b	248.8	130	-	32.3					
	15c	4158.3	-	62.6	260.3					
16	16a	2719.7	130	-	353.6	623.7	50.6	101.2	78.5	7.0
	16b	233.5	130	-	30.4					
	16c	3831.2	-	62.6	239.8					
17	17a	1916.4	130	-	249.1	485.4	51.4	102.8	79.8	7.0
	17b	214.0	130	-	27.8					
	17c	3330.4	-	62.6	208.5					
18	18a	1121.8	130	-	145.8	334.3	52.7	105.4	81.8	7.0
	18b	194.5	130	-	25.3					
	18c	2606.4	-	62.6	163.2					
19	19a	845.9	130	-	110.0	235.5	54.5	109.0	84.6	7.0
	19b	175.1	130	-	22.8					
	19c	1642.1	-	62.6	102.8					
20	20a	950.1	130	-	123.5	179.3	84.3	168.6	130.8	7.0
	20b	79.3	130	-	10.3					
	20c	143.4	125	-	17.9					
	20d	442.8	-	62.6	27.7					

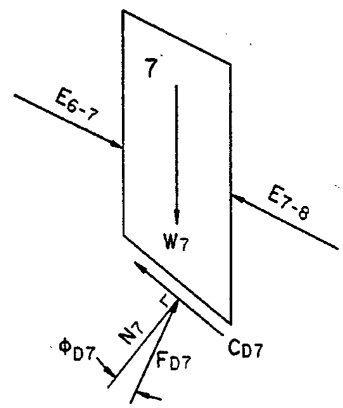
SELECTED DESIGN DATA

MATERIAL	Q-STRENGTH ϕ (deg.)	Q-STRENGTH COHESION, c (kips/sq. ft.)	UNIT WEIGHT (pcf) γ_m-Moist	UNIT WEIGHT (pcf) γ_s-Saturated	UNIT WEIGHT (pcf) γ_b-Buoyant
IMPERVIOUS CORE	5	2.6	128	130	-
RANDOM FILL I	13	2.0	130	133	-
RANDOM FILL II ①	13	2.0	137	140	-
FOUNDATION	9	2.0	120	125	62.6
TRANSITION FILL	32	0	127	136	-
DRAIN FILL	36	0	130	138	-

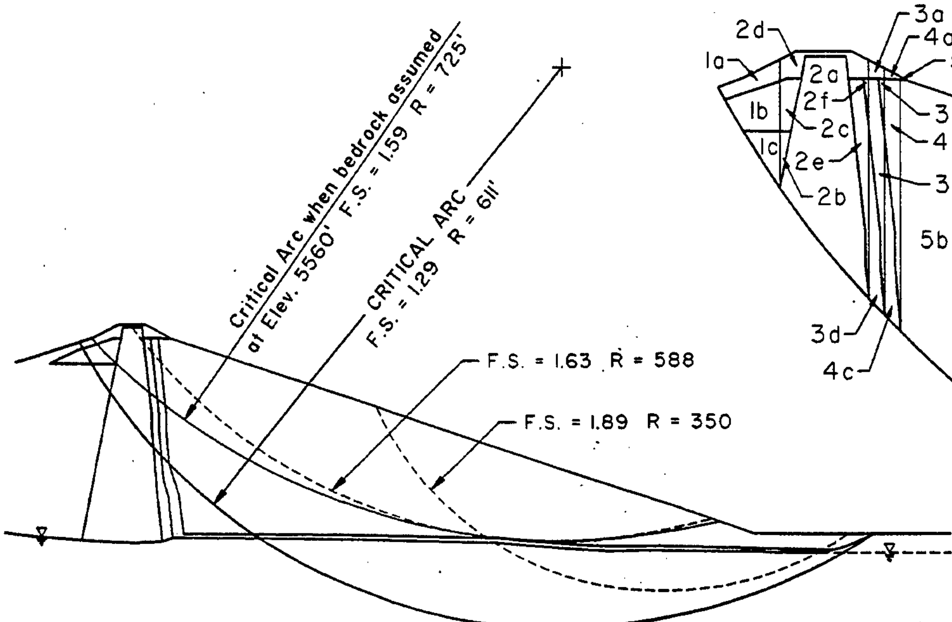
NOTE:

$$\Phi_D = \tan^{-1} \times \frac{\tan \phi}{F.S.}$$

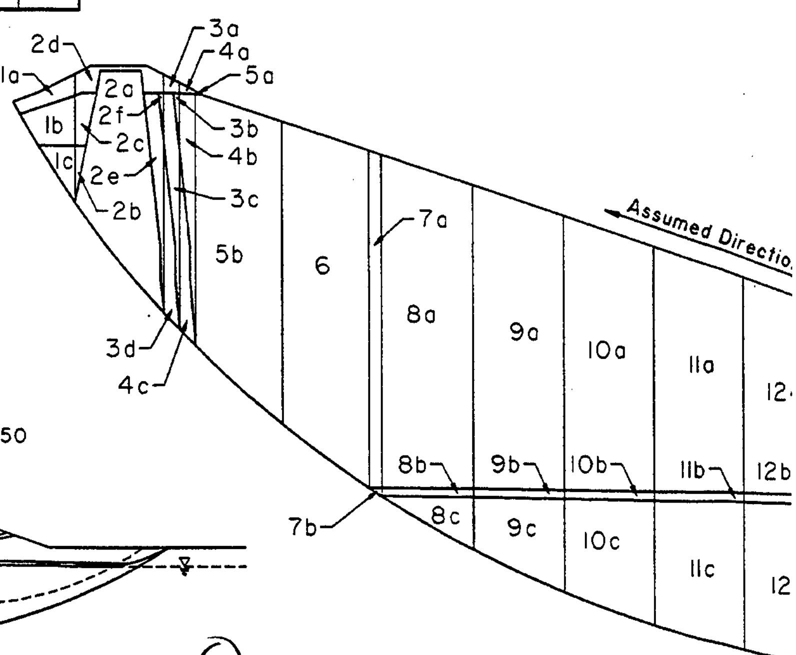
① RANDOM II Q-STRENGTHS ARE CONSERVATIVELY ASSUMED TO BE EQUAL TO RANDOM I STRENGTHS FOR THE STABILITY ANALYSIS.



TYPICAL SLICE



Scale: 1" = 200'

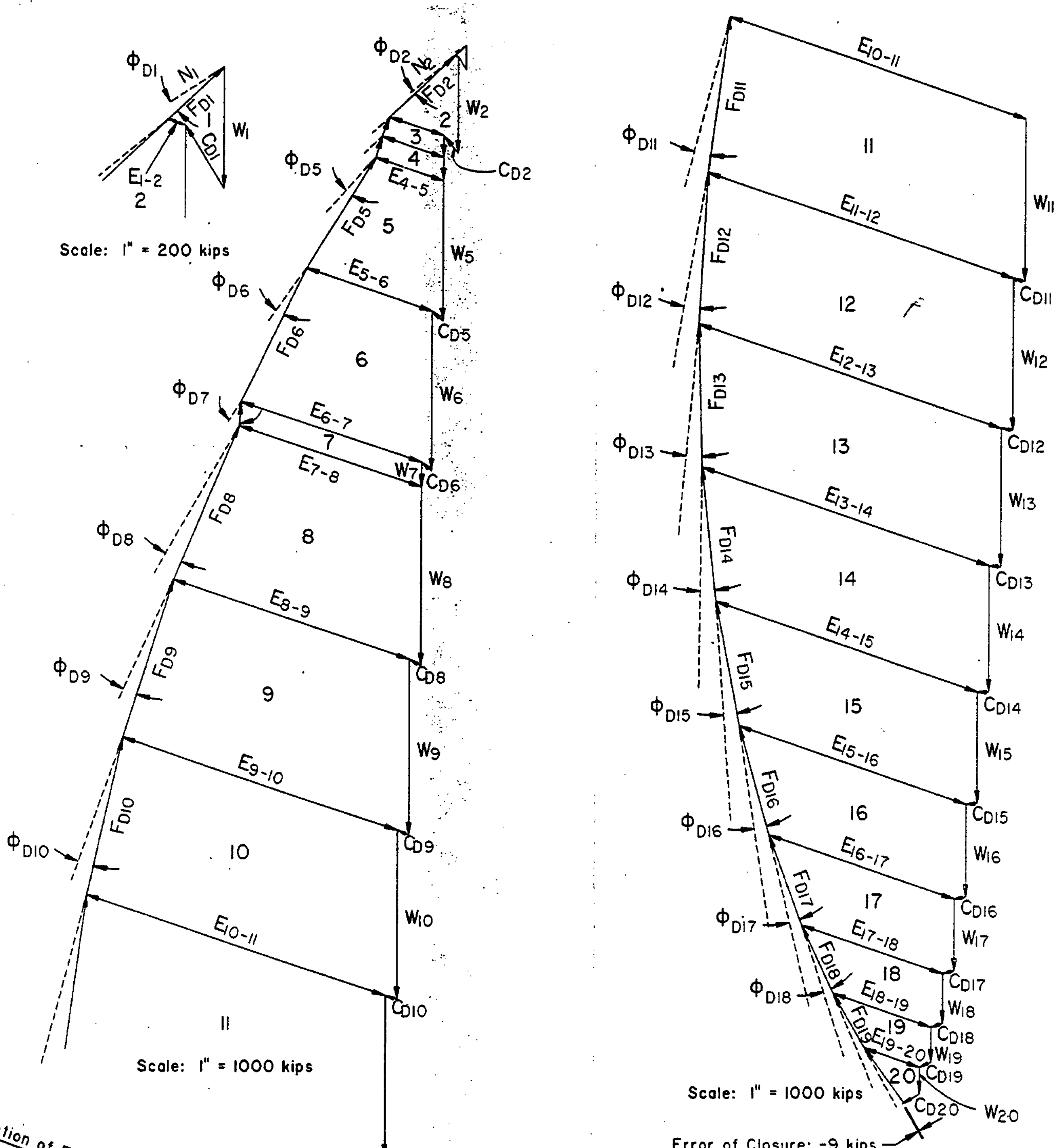


Scale: 1" = 100'

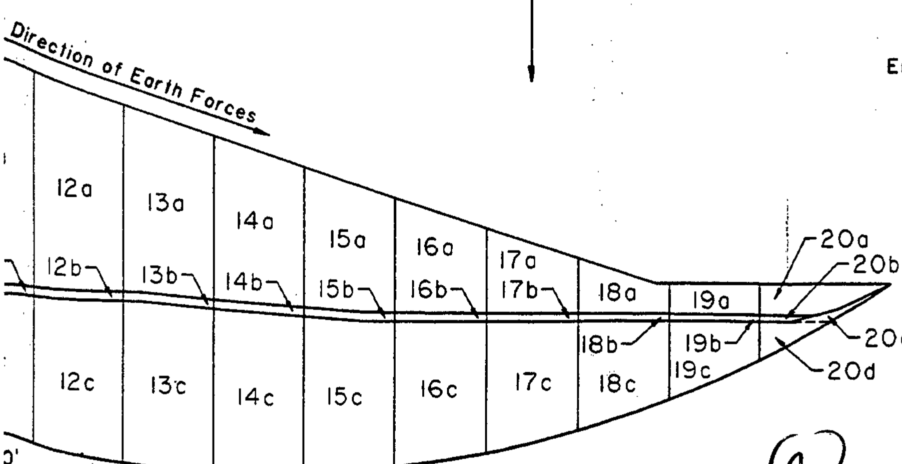
ent

6

CON-
EQUAL
THE



COMPOSITE FORCE POLYGON
FOR F.S. = 1.29



LITTLE DELL LAKE
SALT LAKE CITY STREAMS, UTAH

STABILITY ANALYSIS
END OF CONSTRUCTION

DEPARTMENT OF THE ARMY
SACRAMENTO DISTRICT, CORPS OF ENGINEERS
SACRAMENTO, CALIFORNIA

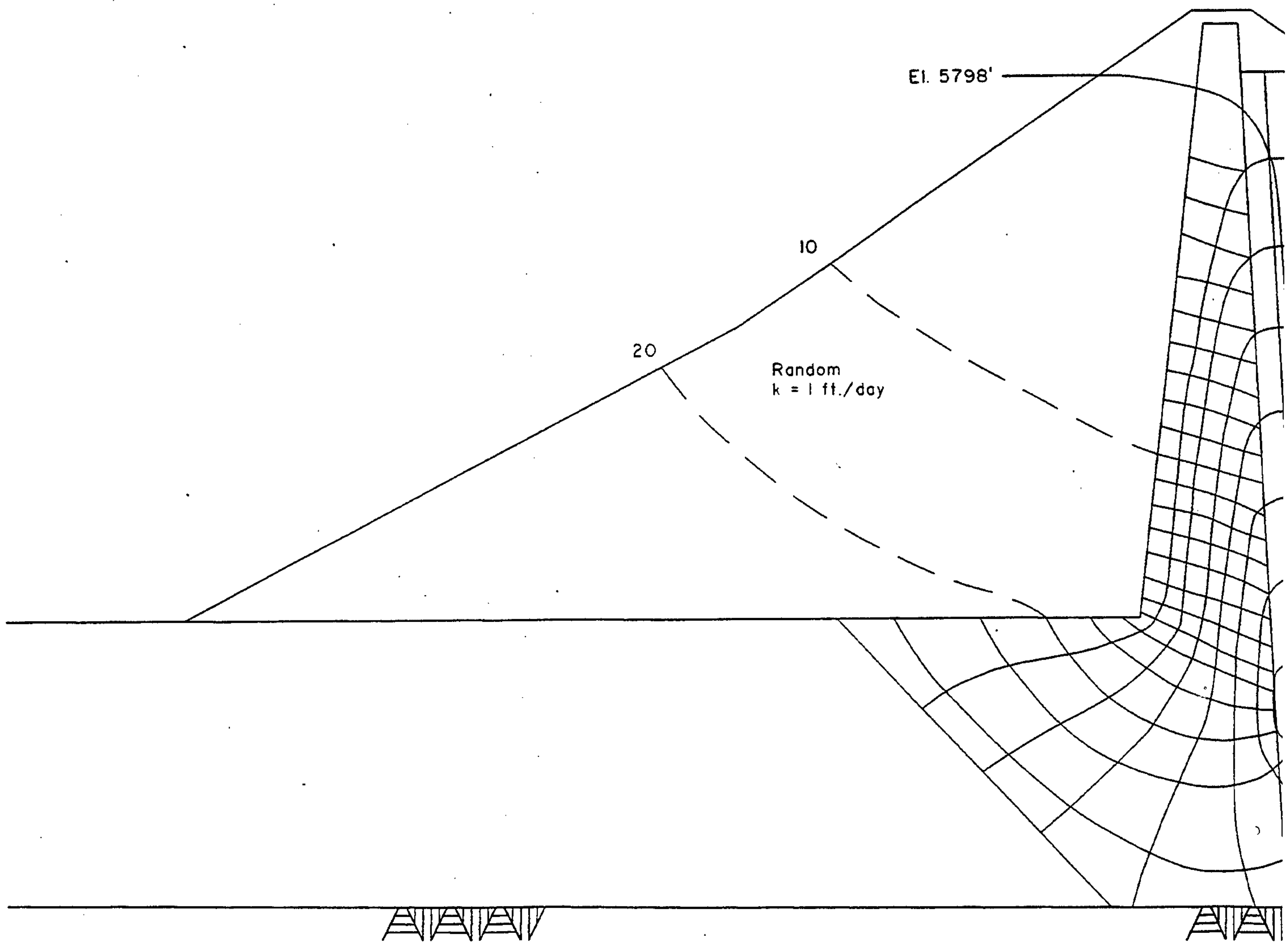
SUBMITTED: DAVE RICKETTS

SUBMITTED: RESIDENT ENGINEER

R. BRADLEY | D. R.

PLATE 39

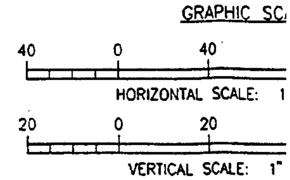
2



Flow Net - Stea

Transformed

k_H = 4k



(1)

Embankment Seepage Calculation

Estimated k for core is 0.01 ft./day

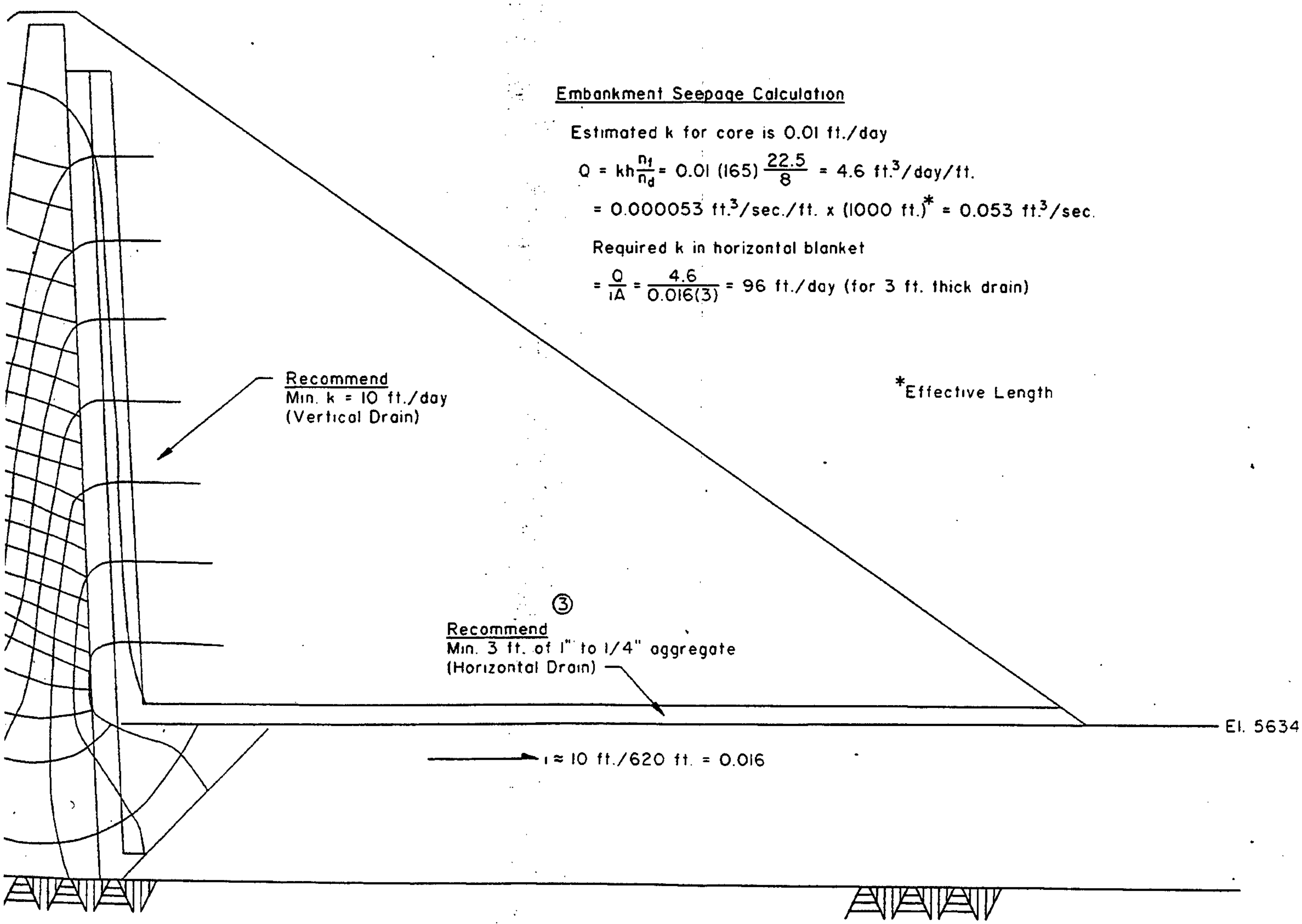
$$Q = kh\frac{n_f}{n_d} = 0.01\,(165)\,\frac{22.5}{8} = 4.6\ \text{ft.}^3/\text{day/ft.}$$

$$= 0.000053\ \text{ft.}^3/\text{sec./ft.} \times (1000\ \text{ft.})^{*} = 0.053\ \text{ft.}^3/\text{sec.}$$

Required k in horizontal blanket

$$= \frac{Q}{iA} = \frac{4.6}{0.016(3)} = 96\ \text{ft./day (for 3 ft. thick drain)}$$

*Effective Length



t - Steady Seepage

onsformed Section

$k_H = 4k_V$

Notes:

1. This Plate provided for information and possible future use in evaluating seepage through the Dam.

2. This plate is redrawn relatively unchanged from Plate 146 (revised April 1988) of the D.M. No. 10, June 1988. The Graphic Scales have been corrected.

3. Based on Hazen's Equation the As-Built permeability of the Inclined and Horizontal Drainage Layers ranges from 15,000 to 200,000 ft/day and averages about 85,000 ft/day.

GRAPHIC SCALES

40 80 120 160 Ft

AL SCALE: 1" = 80 FEET

20 40 60 80 Ft.

L SCALE: 1" = 40 FEET

LITTLE DELL LAKE SALT LAKE CITY STREAMS, UTAH IMPERVIOUS CORE FLOW NET STEADY SEEPAGE			
DEPARTMENT OF THE ARMY SACRAMENTO DISTRICT, CORPS OF ENGINEERS SACRAMENTO, CALIFORNIA			
SUBMITTED: MICHAEL D. RAMSBOTHAM			SUBMITTED: RESIDENT ENGINEER
R. BRADLEY	D. R		PLATE 40

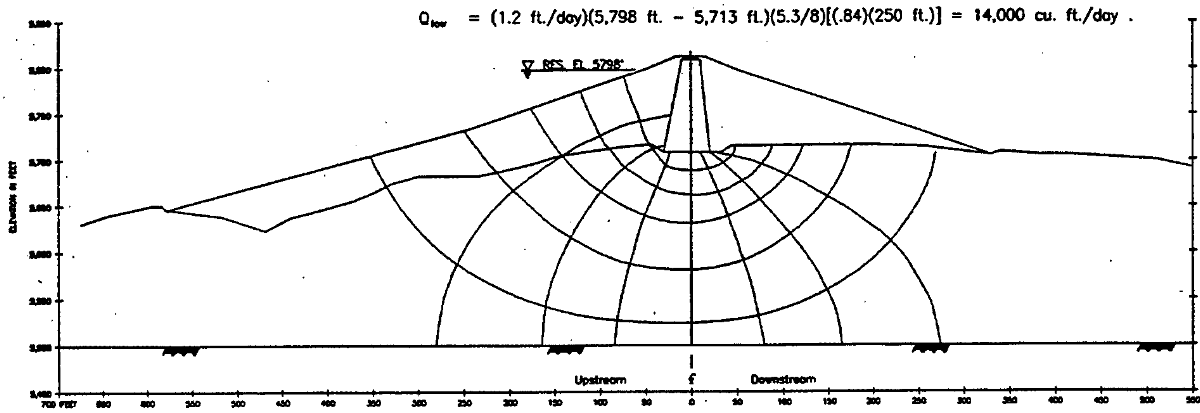
Embankment Seepage Calculation for Model #1

$Q = k \cdot \Delta h \cdot \frac{N_F}{N_D} \cdot W$

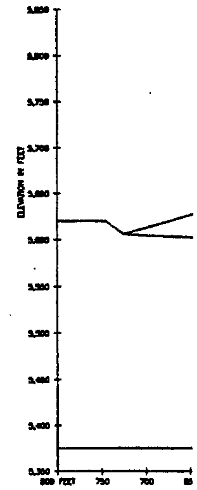
Q_{avg} = (27.9 ft./day)(5,798 ft. − 5,713 ft.)(5.3/8)(250 ft.) = 392,000 cu. ft./day .

Q_{high} = (168 ft./day)(5,798 ft. − 5,713 ft.)(5.3/8)[(.16)(250 ft.)] = 378,000 cu. ft./day .

Q_{low} = (1.2 ft./day)(5,798 ft. − 5,713 ft.)(5.3/8)[(.84)(250 ft.)] = 14,000 cu. ft./day .



MODEL #1
FLOW NET STEADY SEEPAGE
@ STA. 12+00



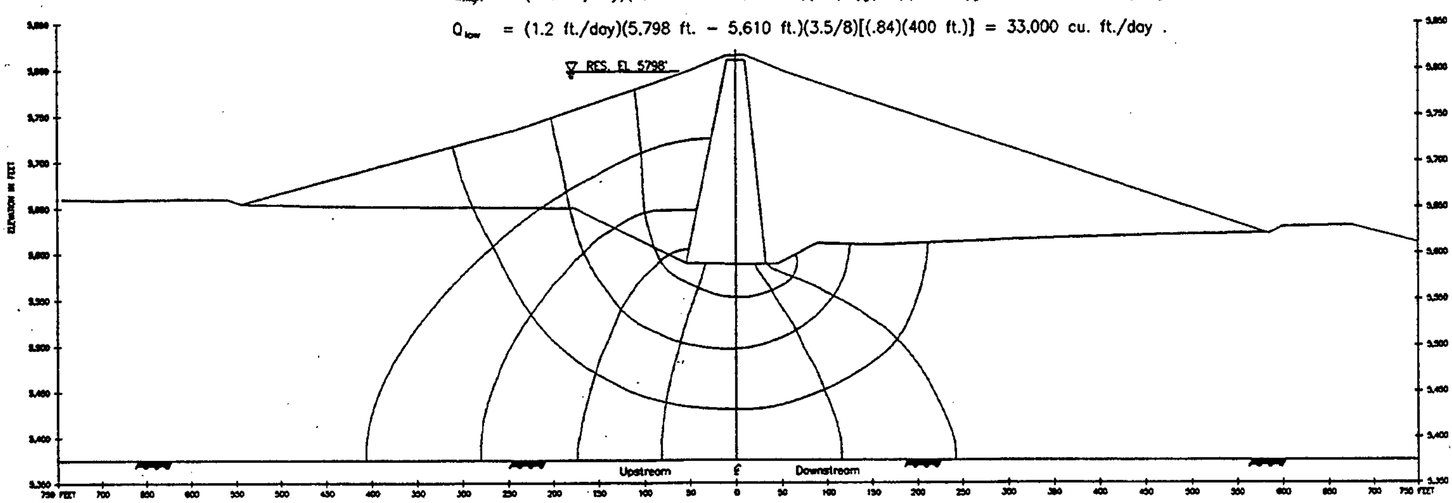
Embankment Seepage Calculation for Model #3

$Q = k \cdot \Delta h \cdot \frac{N_F}{N_D} \cdot W$

Q_{avg} = (27.9 ft./day)(5,798 ft. − 5,610 ft.)(3.5/8)(400 ft.) = 917,000 cu. ft./day .

Q_{high} = (168 ft./day)(5,798 ft. − 5,610 ft.)(3.5/8)[(.16)(400 ft.)] = 884,000 cu. ft./day .

Q_{low} = (1.2 ft./day)(5,798 ft. − 5,610 ft.)(3.5/8)[(.84)(400 ft.)] = 33,000 cu. ft./day .



MODEL #3
FLOW NET STEADY SEEPAGE
@ STA. 18+00

Assumptions for Flow Net Calculations

1. Q_{high} is the seepage quantity calculated for the coefficient of permeability equal to 168 ft./day, which represents 16% of the embankment foundation width.
2. Q_{low} is the seepage quantity calculated for the coefficient of permeability equal to 1.2 ft./day, which represents 84% of the embankment foundation width.
3. Q_{avg} is the average seepage quantity calculated for the coefficient of permeability equal to 27.9 ft./day . This quantity is equal to Q_{high} plus Q_{low} .
4. The horizontal and vertical coefficients of permeability (k) of the foundation are equal.
5. The coefficient of permeability of the embankment random fill equals the coefficient of permeability of the foundation.
6. The central core is impervious (k=0).
7. The depth to an impermeable boundary from the bottom of the core trench is 200 feet.
8. The horizontal drain blanket extends to the impervious core.
9. The "invert" elevation of the drain blanket is equal to the average elevation of the drain blanket at the selected station.
10. Seepage between Stations 10+40 and 11+00 and Stations 26+00 and 27+80 is negligible.
11. $Q = k \cdot \Delta h \cdot \frac{N_F}{N_D} \cdot W$: where k = coefficient of permea the "invert" elevation of the drain blanket; N_F = numb W = effective width of dam associated with a particul
12. Models No. 1, 2, 3 and 4 represent the embankment Station 16+50 to 20+50 and Station 20+50 to 26+
13.

Model @ Station	Effective Width Reach in Stations, (=W ft.)	k
1 @ 12+00	11+00 to 13+50, (250)	
2 @ 14+50	13+50 to 16+50, (300)	
3 @ 18+00	16+50 to 20+50, (400)	
4 @ 23+50	20+50 to 26+00, (550)	

For Grout Curtain 75% e

For Grout Curtain 90% e

1

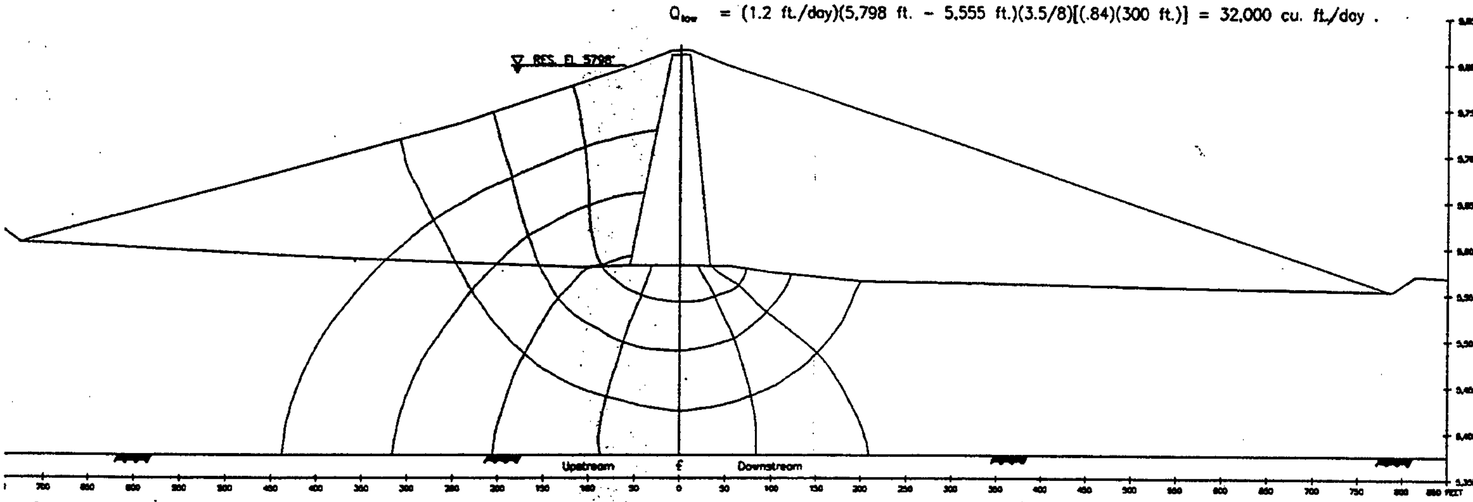
Embankment Seepage Calculation for Model #2

$Q = k \cdot \Delta h \cdot \frac{N_F}{N_D} \cdot W$

Q_{avg} = (27.9 ft./day)(5,798 ft. − 5,555 ft.)(3.5/8)(300 ft.) = 889,000 cu. ft./day .

Q_{high} = (168 ft./day)(5,798 ft. − 5,555 ft.)(3.5/8)[(.16)(300 ft.)] = 857,000 cu. ft./day .

Q_{low} = (1.2 ft./day)(5,798 ft. − 5,555 ft.)(3.5/8)[(.84)(300 ft.)] = 32,000 cu. ft./day .



MODEL #2
FLOW NET STEADY SEEPAGE
@ STA. 14+50

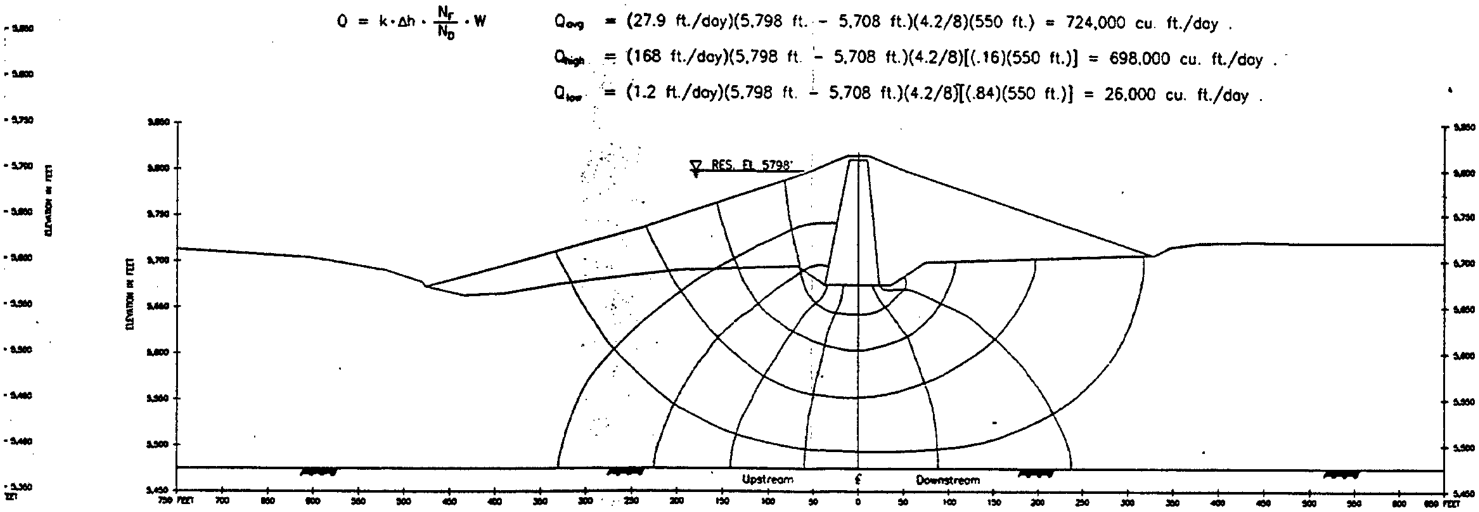
Embankment Seepage Calculation for Model #4

$Q = k \cdot \Delta h \cdot \frac{N_F}{N_D} \cdot W$

Q_{avg} = (27.9 ft./day)(5,798 ft. − 5,708 ft.)(4.2/8)(550 ft.) = 724,000 cu. ft./day .

Q_{high} = (168 ft./day)(5,798 ft. − 5,708 ft.)(4.2/8)[(.16)(550 ft.)] = 698,000 cu. ft./day .

Q_{low} = (1.2 ft./day)(5,798 ft. − 5,708 ft.)(4.2/8)[(.84)(550 ft.)] = 26,000 cu. ft./day .



MODEL #4
FLOW NET STEADY SEEPAGE
@ STA. 23+50

of permeability; Δh = the difference in head, gross pool elevation (5,798') minus
$_F$ = number of flow channels; N_D = number of equipotential drops; and
a particular model/section.
ıbankment from Station 11+00 to 13+50, Station 13+50 to 16+50,
i0 to 26+00 respectively.

ve Width W ft.)	k ft./day	Δh	$\frac{N_F}{N_D}$	Q_{avg} cfs
;0)	27.9	85	$\frac{5.3}{8}$	4.5
)0)	27.9	243	$\frac{3.5}{8}$	10.3
)0)	27.9	188	$\frac{3.5}{8}$	10.6
;0)	27.9	90	$\frac{4.2}{8}$	8.4
		Total Q_{avg} =	34	cfs
ain 75% effective:		.25 Q_{avg} =	8.5	cfs
ain 90% effective:		.10 Q_{avg} =	3.4	cfs

Notes:

1. This Plate provided for information and possible future use in evaluating foundation seepage

2. This plate was originally designed by W.C. Jones, drawn by R. Iwasa and R. Bradley, and checked by M. Ramsbotham in December 1988. It was an addition to D.M. No. 10, June 1988, as Plate 146-A, by addendum 14 December 1988, and is presented here unchanged

GRAPHIC SCALES

100 0 100 200 300 400'

SCALE: 1" = 200 FEET

LITTLE DELL LAKE
SALT LAKE CITY STREAMS, UTAH

FOUNDATION FLOW NETS
STEADY SEEPAGE

DEPARTMENT OF THE ARMY
SACRAMENTO DISTRICT, CORPS OF ENGINEERS
SACRAMENTO, CALIFORNIA

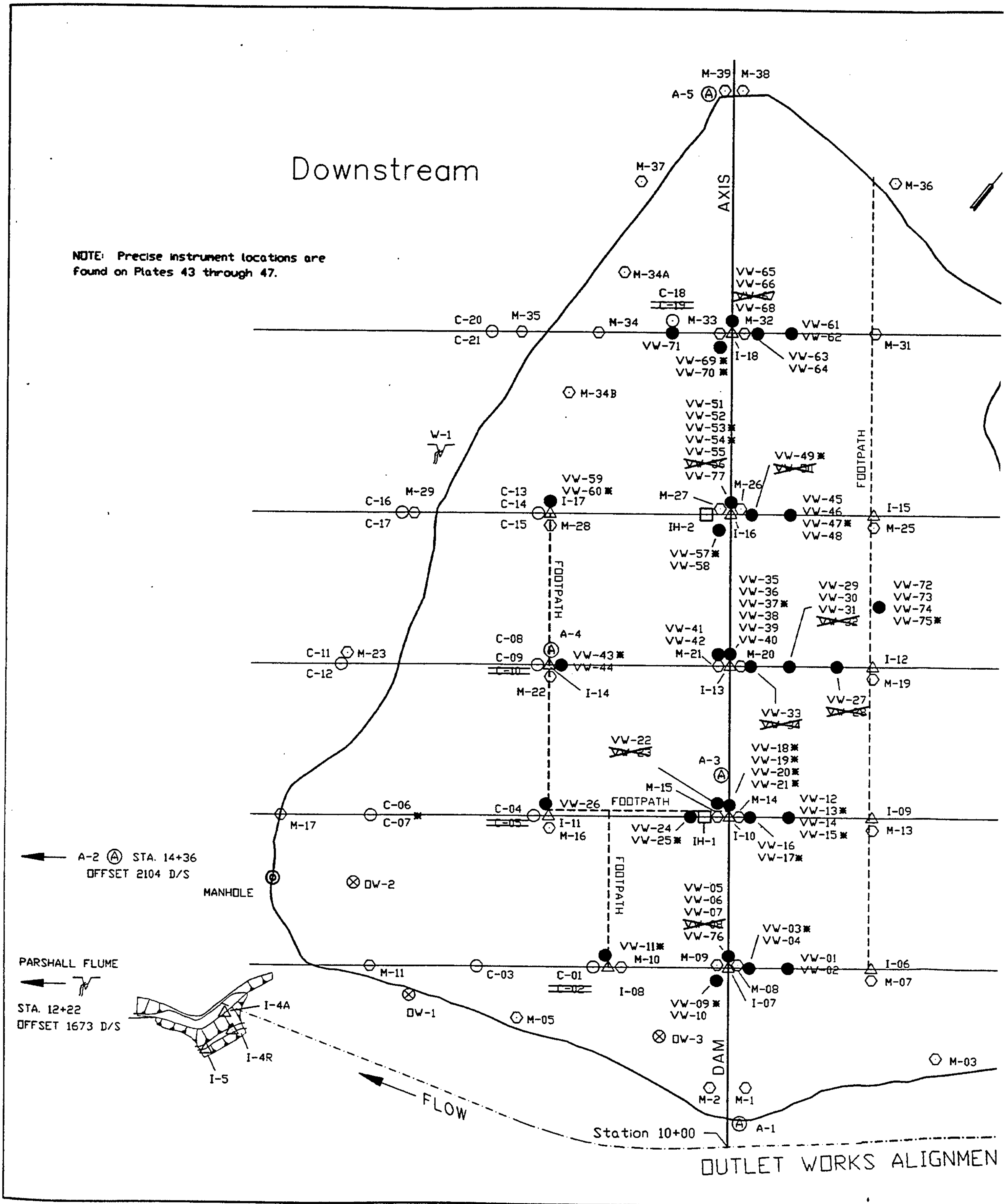
SUBMITTED: MICHAEL D. RAMSBOTHAM

SUBMITTED: RESIDENT ENGINEER

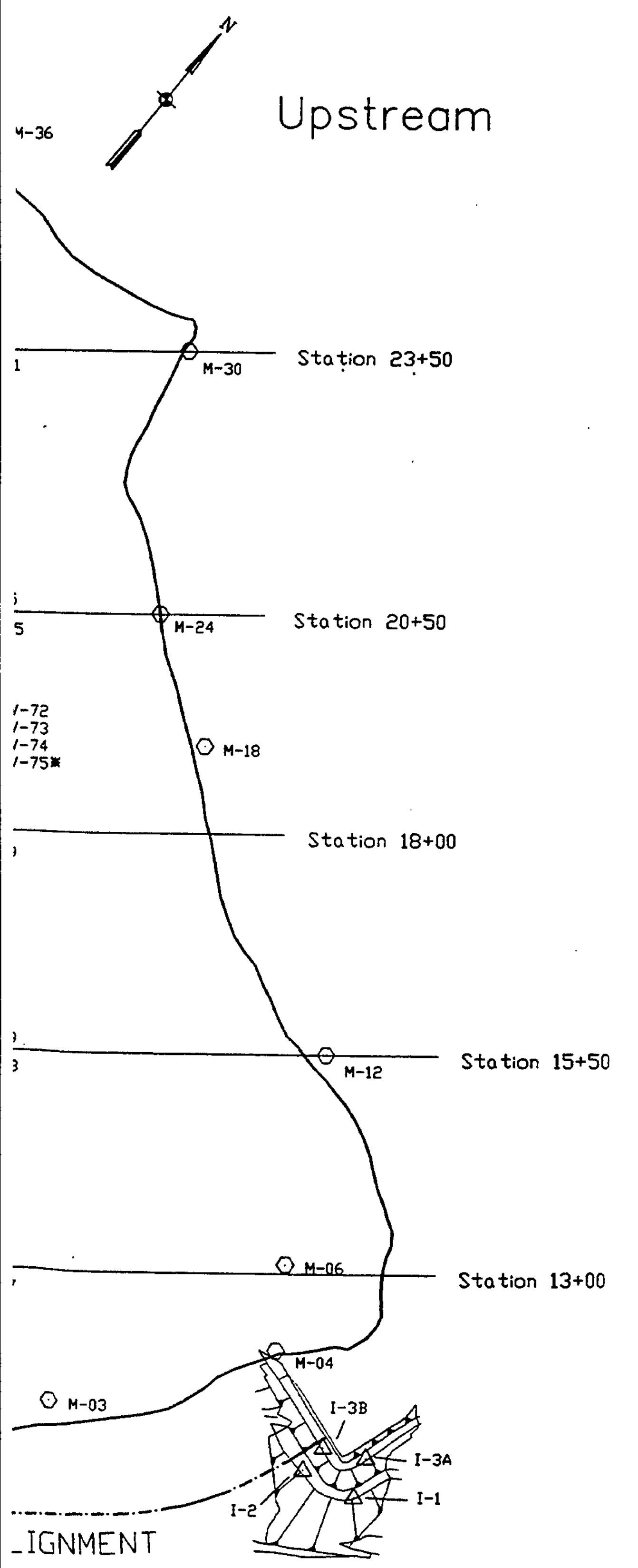
DRAWN BY: R. BRADLEY | CHECKED BY: SEE NOTE 2

PLATE 41

9



Downstream
NOTE: Precise instrument locations are found on Plates 43 through 47.
AXIS
DAM
FOOTPATH
FLOW
MANHOLE
PARSHALL FLUME
STA. 12+22
OFFSET 1673 D/S
A-2 STA. 14+36
OFFSET 2104 D/S
Station 10+00
OUTLET WORKS ALIGNMEN
A-1
A-3
A-4
A-5
M-39
M-38
M-37
M-36
M-34A
M-34B
M-35
M-34
M-33
M-32
M-31
C-18
C-20
C-21
VW-65
VW-66
VW-67
VW-68
VW-61
VW-62
VW-63
VW-64
VW-71
VW-69
VW-70
I-18
W-1
VW-51
VW-52
VW-53
VW-54
VW-55
VW-56
VW-77
VW-49
VW-50
M-26
M-27
IH-2
I-16
VW-45
VW-46
VW-47
VW-48
I-15
M-25
VW-57
VW-58
C-16
C-17
M-29
C-13
C-14
C-15
VW-59
VW-60
I-17
M-28
VW-35
VW-36
VW-37
VW-38
VW-39
VW-40
VW-29
VW-30
VW-31
VW-32
VW-72
VW-73
VW-74
VW-75
VW-41
VW-42
M-21
M-20
I-13
I-12
M-19
VW-33
VW-34
VW-27
VW-28
C-11
C-12
M-23
C-08
C-09
C-10
VW-43
VW-44
M-22
I-14
VW-22
VW-23
VW-18
VW-19
VW-20
VW-21
M-15
M-14
VW-12
VW-13
VW-14
VW-15
I-09
M-13
C-06
C-07
M-17
C-04
C-05
VW-26
I-11
M-16
VW-24
VW-25
IH-1
I-10
VW-16
VW-17
DW-2
VW-05
VW-06
VW-07
VW-08
VW-76
VW-03
VW-04
VW-11
M-10
M-09
VW-01
VW-02
I-06
M-07
M-11
C-03
C-01
C-02
I-08
M-08
I-07
VW-09
VW-10
I-4A
I-4R
I-5
DW-1
M-05
DW-3
M-03
M-2
M-1



SURVEY MONUMENT LOCATIONS - BASELINE

MONUMENT NUMBER	CONST. COORDINATES		ELEVATION	STATE PLANE COORDINATES	
	STATION	OFFSET		NORTH	EAST
* M-01	11+00±	28± U/S	5812.92	7448632.862	1584560.788
* M-02	11+00±	28± D/S	5813.66	7448597.859	1584517.185
M-03	11+50.78	350.03 U/S	5704.67	INUNDATED	INUNDATED
M-04	12+12.24	615.75 U/S	5635.46	INUNDATED	INUNDATED
* M-05	12+13.90	351.19 D/S	5709.31	7448482.606	1584197.484
M-06	13+10.63	625.83 U/S	5631.81	INUNDATED	INUNDATED
M-07	12+91.00	240.81 U/S	5733.59	INUNDATED	INUNDATED
* M-08	13+00±	13± U/S	5814.06	7448772.602	1584430.250
* M-09	13+00±	13± D/S	5814.34	7448753.583	1584409.564
* M-10	12+95.17	199.14 D/S	5746.37	7448641.490	1584263.052
* M-11	13+00.28	599.93 D/S	5620.81	7448391.708	1583949.798
M-12	15+50.20	670.81 U/S	5630.66	INUNDATED	INUNDATED
M-13	15+39.32	241.30 U/S	5733.47	INUNDATED	INUNDATED
* M-14	15+50±	13± U/S	5814.41	7448954.695	1584281.585
* M-15	15+50±	13± D/S	5814.54	7448932.697	1584258.108
* M-16	15+39.91	298.74 D/S	5711.95	7448767.908	1584031.169
* M-17	15+49.77	749.73 D/S	5588.41	7448489.867	1583676.229
M-18	18+99.74	524.84 U/S	5666.19	INUNDATED	INUNDATED
M-19	17+90.42	240.51 U/S	5733.32	INUNDATED	INUNDATED
* M-20	18+00±	13± U/S	5814.39	7449159.472	1584113.226
* M-21	18+00±	13± D/S	5814.71	7449140.161	1584091.960
* M-22	17+90.14	298.37 D/S	5712.15	7448961.818	1583873.053
* M-23	18+18.44	639.91 D/S	5630.74	7448767.524	1583590.875
M-24	20+50.39	470.33 U/S	5673.05	INUNDATED	INUNDATED
M-25	20+40.33	240.24 U/S	5733.44	INUNDATED	INUNDATED
* M-26	20+50±	13± U/S	5814.05	7449379.530	1583932.226
* M-27	20+50±	13± D/S	5814.26	7449361.368	1583911.888
* M-28	20+40.12	299.88 D/S	5712.29	7449154.386	1583713.676
* M-29	20+49.34	529.66 D/S	5652.56	7449016.017	1583530.022
M-30	23+50.24	499.74 U/S	5696.02	INUNDATED	INUNDATED
M-31	23+50.58	241.05 U/S	5732.84	INUNDATED	INUNDATED
* M-32	23+50±	13± U/S	5813.71	7449583.621	1583765.353
* M-33	23+50±	13± D/S	5813.93	7449566.266	1583744.083
* M-34	23+49.59	221.87 D/S	5739.60	7449443.188	1583578.096
* M-34A	24+49.65	179.95 D/S	5753.08	7449547.099	1583547.187
* M-34B	22+49.88	270.03 D/S	5724.25	7449335.603	1583603.975
* M-35	23+50.07	349.46 D/S	5716.46	7449362.755	1583479.071
M-36	25+99.70	272.20 U/S	5737.17	INUNDATED	INUNDATED
* M-37	25+99.73	153.56 D/S	5778.53	7449680.074	1583472.643
* M-38	27+50±	13± U/S	5812.95	7449863.542	1583538.060
* M-39	27+50±	13± D/S	5813.31	7449845.599	1583516.042

NOTE: The State Plane coordinates and elevations for monuments indicated with a "*" were determined during the 25 OCT 1993 survey. This survey utilized Global Positioning System (GPS) satellites and forms the post construction alignment baseline. Data listed for those monuments inundated by the reservoir pool during this survey were determined using the construction control survey of 15 OCT 1992.

INSTRUMENTATION SYMBOL LEGEND

□	IH-1	INSTRUMENT HOUSE
△	I-07	INCLINOMETER
○	C-06	OPEN TUBE PIEZOMETER
●	VW-1	VIBRATING WIRE PIEZOMETER
⊗	OW-3	OBSERVATION WELL
⬡	M-07	SURVEY MONUMENT
Ⓐ	A-5	ACCELEROGRAPH
	W-1	FLOW MEASUREMENT DEVICE
◎		MANHOLE
	VW-75*	LIGHTNING DAMAGED VWP
	~~VW-32~~	LIGHTNING DESTROYED VWP
	~~C-02~~	OTP DESTROYED DURING CONSTRUCTION

SCALE: 1"=200' 100' 0 200' 400'

LITTLE DELL LAKE
SALT LAKE CITY STREAMS, UTAH

PLAN VIEW OF INSTRUMENTATION

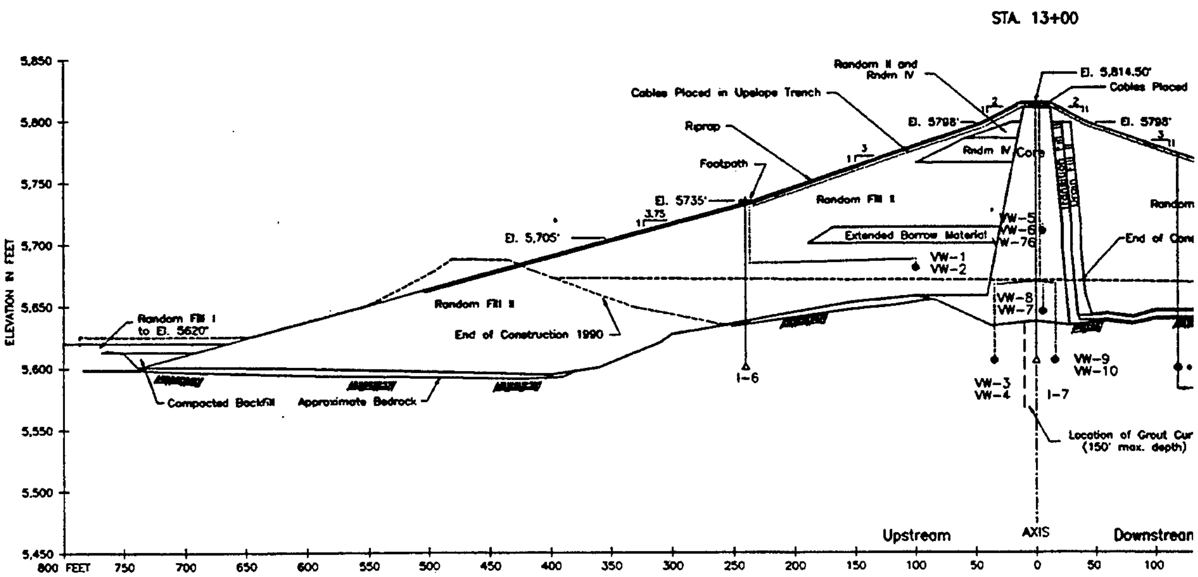
DEPARTMENT OF THE ARMY
SACRAMENTO DISTRICT, CORPS OF ENGINEERS
SACRAMENTO, CALIFORNIA

SUBMITTED:
MICHAEL D. RAMSBOTHAM

APPROVED:
RESIDENT ENGINEER

DR BY	CHECKED BY	CHECKED BY	FILE No.
JWR	JWR	MDR	PLATE 42

2



NAME	TYPE	STATION	DAM AXIS OFFSET	TIP ELEV. IN FEET	MATERIAL TYPE	INSTALLATION FILL ELEV.	METHOD OF INSTALLATION
VW-1	VIBRATING WIRE PIEZO	13+00	100 U/S	5681.1	RANDOM FILL II	5686.9	SINGLE PAIR VIBRATING WIRE/EMB.
VW-2	VIBRATING WIRE PIEZO	13+00	100 U/S	5680.3	RANDOM FILL II	5686.9	SINGLE PAIR VIBRATING WIRE/EMB.
VW-3	VIBRATING WIRE PIEZO	13+00	35 U/S	5606.0	BEDROCK, U/S FROM GROUT CURTAIN	5666.4	SINGLE PAIR VIBRATING WIRE/FND.
VW-4	VIBRATING WIRE PIEZO	13+00	35 U/S	5605.4	BEDROCK, U/S FROM GROUT CURTAIN	5666.4	SINGLE PAIR VIBRATING WIRE/FND.
VW-5	VIBRATING WIRE PIEZO	13+00	5 D/S	5710.8	CORE	5714.7	SINGLE PAIR VIBRATING WIRE/CORE
VW-6	VIBRATING WIRE PIEZO	13+00	5 D/S	5710.0	CORE	5714.7	SINGLE PAIR VIBRATING WIRE/CORE
VW-7	VIBRATING WIRE PIEZO	13+00	5 D/S	5644.9	CORE	5667.1	SINGLE PAIR VIBRATING WIRE/CORE
VW-8	VIBRATING WIRE PIEZO	13+00	5 D/S	5645.5	CORE	5667.1	SINGLE PAIR VIBRATING WIRE/CORE
VW-9	VIBRATING WIRE PIEZO	13+00	15 D/S	5610.4	BEDROCK, D/S FROM GROUT CURTAIN	5668.7	SINGLE PAIR VIBRATING WIRE/FND.
VW-10	VIBRATING WIRE PIEZO	13+00	15 D/S	5609.6	BEDROCK, D/S FROM GROUT CURTAIN	5668.7	SINGLE PAIR VIBRATING WIRE/FND.
VW-11	VIBRATING WIRE PIEZO	13+00	205 D/S	5616.2	BEDROCK	5660.2	SINGLE VIBRATING WIRE WITH OPEN TUBE/FND.
C-1	OPEN TUBE PIEZO	13+00	205 D/S	5676.0	RANDOM FILL I	5681.0	SINGLE OPEN TUBE ADDED IN EMB.
C-2	OPEN TUBE PIEZO	13+00	205 D/S	5615.2	BEDROCK	5660.2	SINGLE VIBRATING WIRE WITH OPEN TUBE/FND.
C-3	OPEN TUBE PIEZO	13+00	420 D/S	5615.7	BEDROCK	5632.3	SINGLE OPEN TUBE/FND.
I-6	INCLINOMETER	13+00	240 U/S	5602.7	BEDROCK	5640.9	INCLINOMETER
I-7	INCLINOMETER	13+00	0	5594.8	BEDROCK	5666.8	INCLINOMETER
I-8	INCLINOMETER	13+00	200 D/S	5613.0	BEDROCK	5660.3	INCLINOMETER
OW-1	OBSERVATION WELL	12+51	534 D/S	5602.0	BEDROCK	5655.6	OBSERVATION WELL
OW-3	OBSERVATION WELL	11+85	118 D/S	5599.0	BEDROCK	5728.2	OBSERVATION WELL
VW-76	VIBRATING WIRE PIEZO	13+10	5 D/S	5709.0	CORE	5714.7	HIGH AIR ENTRY FILTER; DIRECT BURIAL VWP

INSTRUMENT

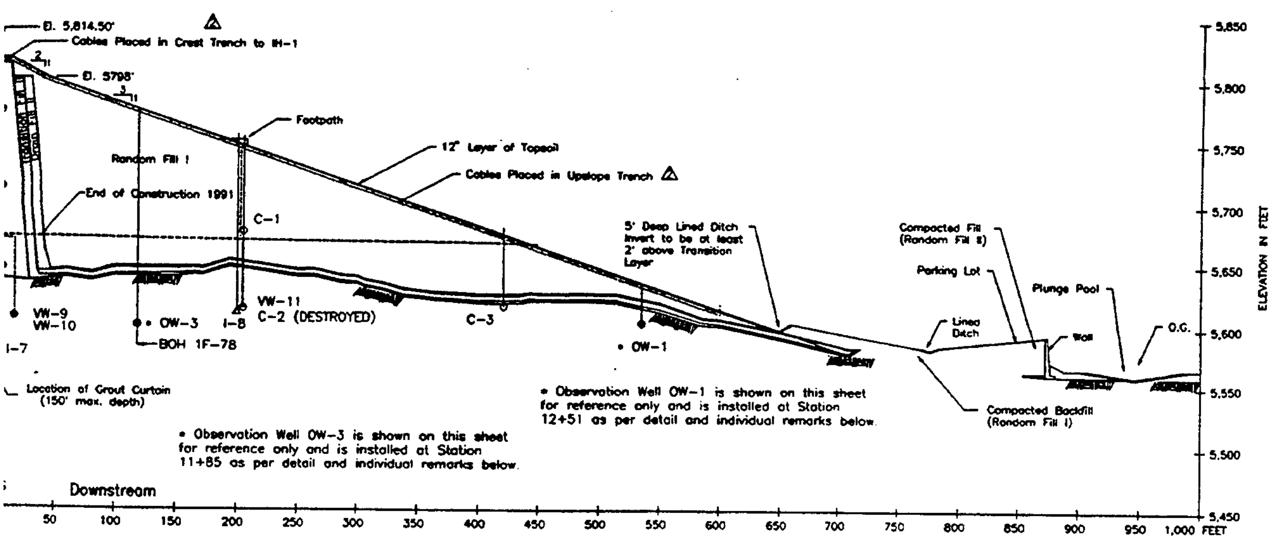
SYMBOL	INSTRU
I-6	INCLINO
C-1	OPEN TL
OW-1	OBSERV
VW-2	VIBRATIN
VW-11 C-2	VIBRATIN TUBE PI
	VIBRATIN CABLE (I

Notes:

1. All instrument cables routed in trenches are placed with approximately 10 feet of slack length for every 100 feet of trench.
2. The term "Connector Trench" refers to an excavated trench on the approximately horizontal fill surface to route the vibrating wire cables from the point of installation to the appropriate inclinometer instrument mound where they shall be advanced vertically with the fill.
3. The term "Upslope Trench" refers to an excavated trench on the final grade to route the vibrating wire cables from the instrument mound, upslope, to a manhole at the crest which shall serve as a junction for the cables and as an enclosure for an Inclinometer located on the dam axis.
4. The term "Crest Trench" refers to an excavated trench on the dam crest prior to construction of the paved road to route the vibrating wire cables from the manhole junction(s) to one of the two permanent Instrument House enclosures
5. Open Tube Piezometers C-18 thru C-21 are retrofitted with a 1/2" diameter Vibrating Wire Transducer for the purpose of remote sensing the water levels in these instruments from Instrument House IH-2. The method and timing for each installation shall be approved by the Government Representative in the field.

LITTLE DELL PROJECT: PL-43 (LDIKE1RO.DWG) (EMB) 25 MAY 94 NLB

3+00



LATION	REMARKS
E/EMB.	INSTALLED WITH VW-2. Spliced 10-05-92 @ Sta. 13+11. 38 u/s. 5797 ft.
E/EMB.	INSTALLED WITH VW-1. Spliced 11-21-92 @ Sta. 13+00. 10 d/s. 5810 ft.
E/FND.	INSTALLED WITH VW-4.
E/FND.	INSTALLED WITH VW-3.
E/CORE	INSTALLED WITH VW-6 AND IN CONJUNCTION WITH VW-76.
E/CORE	INSTALLED WITH VW-5 AND IN CONJUNCTION WITH VW-76.
E/CORE	INSTALLED WITH VW-8.
E/CORE	INSTALLED WITH VW-7.
E/FND.	INSTALLED WITH VW-10. Note that sand section of installation is 8.1 ft. vs. nominal 5 ft. Sand section extended to cover water loss at el. 5614.7 ft.
E/FND.	INSTALLED WITH VW-9. Note that sand section of installation is 8.1 ft. vs. nominal 5 ft. Sand section extended to cover water loss at el. 5614.7 ft.
H OPEN TUBE/FND.	INSTALLED WITH C-2. Spliced 11-22-92 @ Back of Instrument House IH-1.
IN EMB.	INSTALLED ALONE. Spliced 09-28-91 @ el. 5651.8 ft.
H OPEN TUBE/FND.	*** NON FUNCTIONAL *** – Open Tube was damaged by settlement of the embankment during construction.
	INSTALLED ALONE. Open tube spliced at el. 5651.8 ft. C-3 VWP cable spliced 11-12-92 @ Sta 15+50. Axis, el. 5810 ft.
	INSTALLATION OKAY. The bottom of this installation was grouted twice. NOTE – Bedrock has high permeability
	Inclinometer grouted to top of rock due to installation problem. Grouted section 44 ft. Spliced 04-21-92 @ approx el. 5660 ft.
	INSTALLATION OKAY. Spliced 10-17-91 @ el. 5667.3 ft.
	INSTALLED AT 12+51. Located in a highly fractured sandstone to maximize potential for measuring end around seepage.
	RECOVERED 1F-78 as an observation well. An exploratory hole previously used as a piezometer. It will provide useful end around seepage data.
ECT BURIAL VWP	INSTALLED IN CONJUNCTION WITH VW-5,6. Used for comparison of pore pressure measurements between contract installation method and direct burial method.

INSTRUMENT LEGEND

YMBOL	INSTRUMENT TYPE
I-6	INCLINOMETER
C-1	OPEN TUBE PIEZOMETER
OW-1	OBSERVATION WELL
VW-2	VIBRATING WIRE PIEZOMETER
VW-11 C-2	VIBRATING WIRE AND OPEN TUBE PIEZOMETERS
	VIBRATING WIRE PIEZOMETER CABLE (LEADLINE) ROUTE

GRAPHIC SCALE

50 0 50 100 150 200 250 FEET

SCALE: 1" = 150 FEET

LITTLE DELL LAKE
SALT LAKE CITY STREAMS, UTAH

INSTRUMENTATION SECTION

STATION 13+00

DEPARTMENT OF THE ARMY
SACRAMENTO DISTRICT, CORPS OF ENGINEERS
SACRAMENTO, CALIFORNIA

SUBMITTED: MICHAEL D. RAMSBOTHAM

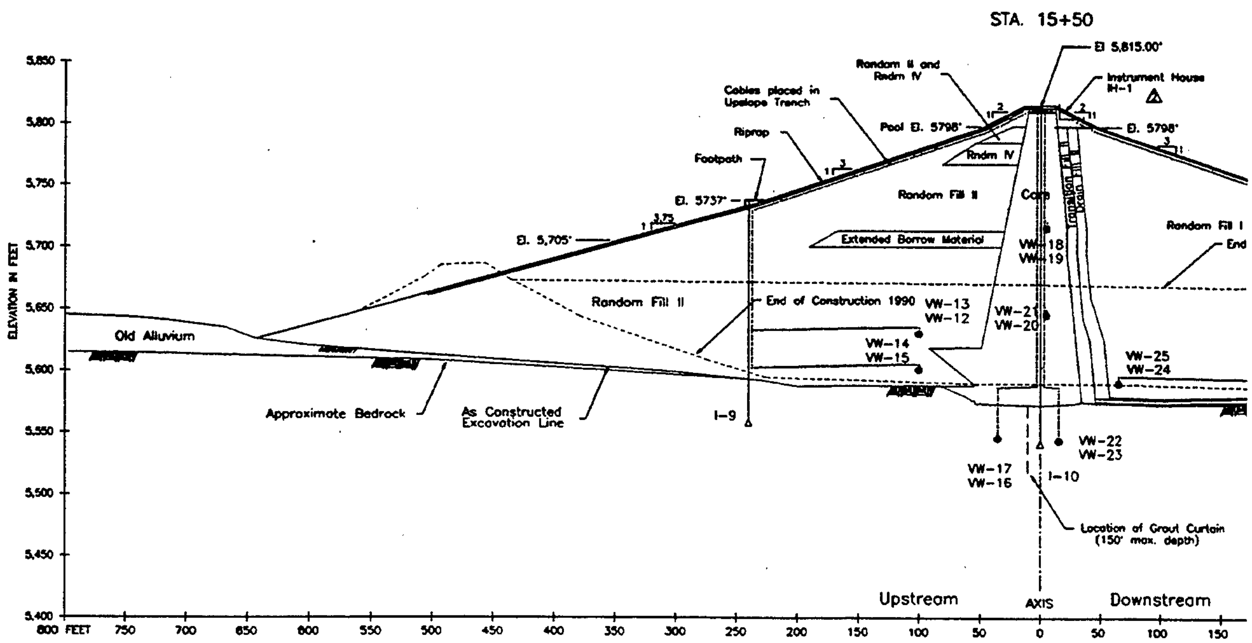
SUBMITTED: RESIDENT ENGINEER

Drawn by: J ROADIFER

Checked by: M D R

PLATE 43

J



NAME	TYPE	STATION	OFFSET	TIP ELEV. IN FEET	MATERIAL TYPE	INSTALLATION FILL ELEV.	METHOD OF INSTALLATION	
VW-12	VIBRATING WIRE PIEZO	15+50	100 U/S	5630.0	RANDOM FILL II	5636.5	SINGLE PAIR VIBRATING WIRE/EMB.	INS
VW-13	VIBRATING WIRE PIEZO	15+50	100 U/S	5630.8	RANDOM FILL II	5636.5	SINGLE PAIR VIBRATING WIRE/EMB.	INS
VW-14	VIBRATING WIRE PIEZO	15+50	100 U/S	5601.8	RANDOM FILL II	5606.0	SINGLE PAIR VIBRATING WIRE/EMB.	INS
VW-15	VIBRATING WIRE PIEZO	15+50	100 U/S	5601.2	RANDOM FILL II	5606.0	SINGLE PAIR VIBRATING WIRE/EMB.	INS
VW-16	VIBRATING WIRE PIEZO	15+50	35 U/S	5545.4	BEDROCK, U/S FROM GROUT CURTAIN	5589.9	SINGLE PAIR VIBRATING WIRE/FND.	INS
VW-17	VIBRATING WIRE PIEZO	15+50	35 U/S	5546.2	BEDROCK, U/S FROM GROUT CURTAIN	5589.9	SINGLE PAIR VIBRATING WIRE/FND.	INS
VW-18	VIBRATING WIRE PIEZO	15+50	5 D/S	5716.8	CORE	5720.1	SINGLE PAIR VIBRATING WIRE/EMB.	INS
VW-19	VIBRATING WIRE PIEZO	15+50	5 D/S	5716.0	CORE	5720.1	SINGLE PAIR VIBRATING WIRE/EMB.	INS
VW-20	VIBRATING WIRE PIEZO	15+50	5 D/S	5645.0	CORE	5650.0	SINGLE PAIR VIBRATING WIRE/EMB.	INS
VW-21	VIBRATING WIRE PIEZO	15+50	5 D/S	5645.8	CORE	5650.0	SINGLE PAIR VIBRATING WIRE/EMB.	INS
VW-22	VIBRATING WIRE PIEZO	15+50	15 D/S	5544.1	BEDROCK, D/S FROM GROUT CURTAIN	5589.1	SINGLE PAIR VIBRATING WIRE/FND.	INS
VW-23	VIBRATING WIRE PIEZO	15+50	15 D/S	5543.3	BEDROCK, D/S FROM GROUT CURTAIN	5589.1	SINGLE PAIR VIBRATING WIRE/FND.	INS
VW-24	VIBRATING WIRE PIEZO	15+50	65 D/S	5590.0	RANDOM FILL I	5594.1	SINGLE PAIR VIBRATING WIRE/EMB.	INS
VW-25	VIBRATING WIRE PIEZO	15+50	65 D/S	5590.8	RANDOM FILL I	5594.1	SINGLE PAIR VIBRATING WIRE/EMB.	INS
VW-26	VIBRATING WIRE PIEZO	15+50	305 D/S	5563.4	BEDROCK	5589.6	SINGLE VIBRATING WIRE WITH OPEN TUBE/FND.	INS
C-4	OPEN TUBE PIEZO	15+50	305 D/S	5605.0	RANDOM FILL I	5613.0	SINGLE OPEN TUBE/ADDED IN EMB.	INS
C-5	OPEN TUBE PIEZO	15+50	305 D/S	5562.3	BEDROCK	5589.6	SINGLE VIBRATING WIRE WITH OPEN TUBE/FND.	***
C-6	OPEN TUBE PIEZO	15+50	600 D/S	5592.0	RANDOM FILL I	5597.0	SINGLE OPEN TUBE/ADDED IN EMB.	INS
C-7	OPEN TUBE PIEZO	15+50	600 D/S	5556.5	BEDROCK	5579.5	SINGLE OPEN TUBE/FND.	INS
I-9	INCLINOMETER	15+50	240 U/S	5559.9	BEDROCK	5596.9	INCLINOMETER	INS
I-10	INCLINOMETER	15+50	0	5544.0	BEDROCK	5589.2	INCLINOMETER	INS
I-11	INCLINOMETER	15+50	300 D/S	, 5540.0	BEDROCK	5589.8	INCLINOMETER	INS
OW-2	OBSERVATION WELL	14+38	628 D/S	5558.2	DRAIN BLANKET	5578.4	OBSERVATION WELL	INS

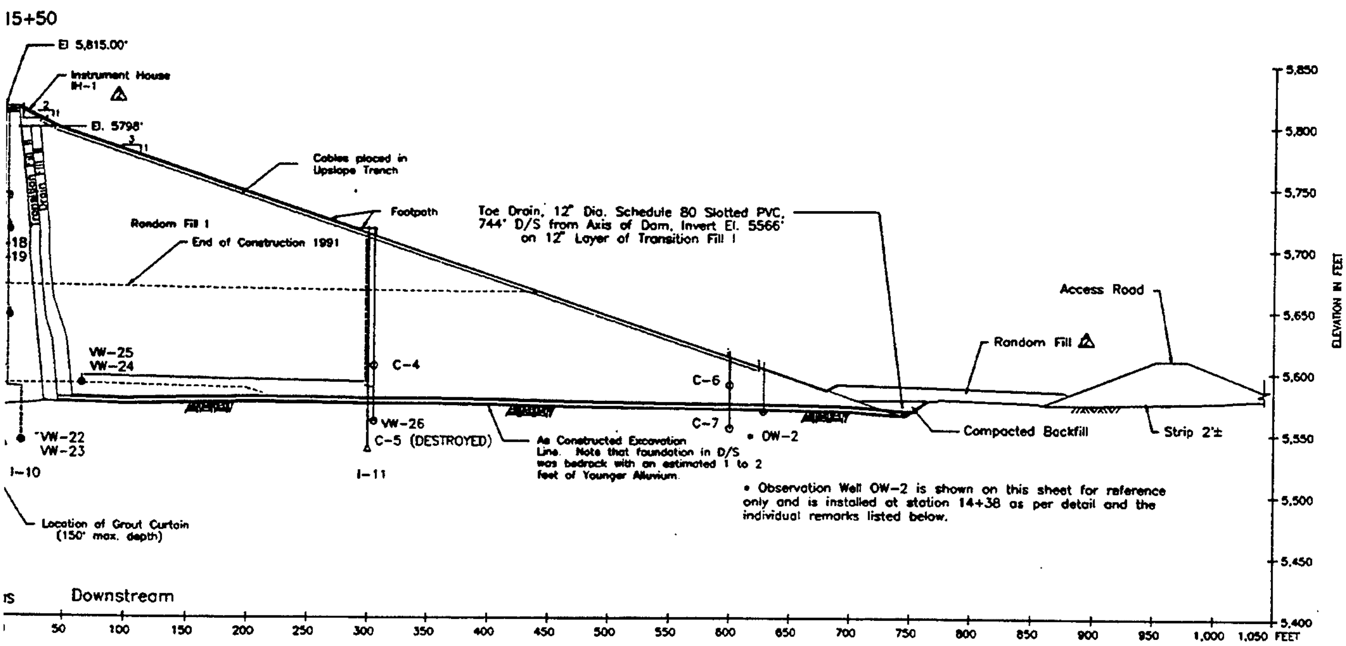
INSTRUMENT LEGEN

SYMBOL		INSTRUMENT TY
	I-6	INCLINOMETER
	C-1	OPEN TUBE PIEZ
	OW-1	OBSERVATION WE
	VW-2	VIBRATING WIRE I
	VW-11 C-2	VIBRATING WIRE / TUBE PIEZOMETEI
		VIBRATING WIRE P CABLE (LEADLINE)

Notes:

1. All instrument cables routed in trenches are placed with approximately 10 feet of slack length for every 100 feet of trench.
2. The term "Connector Trench" refers to an excavated trench on the approximately horizontal fill surface to route the vibrating wire cables from the point of installation to the appropriate inclinometer instrument mound where they shall be advanced vertically with the fill.
3. The term "Upslope Trench" refers to an excavated trench on the final grade to route the vibrating wire cables from the instrument mound, upslope, to a manhole at the crest which shall serve as a junction for the cables and as an enclosure for an inclinometer located on the dam axis..
4. The term "Crest Trench" refers to an excavated trench on the dam crest prior to construction of the paved road to route the vibrating wire cables from the manhole junction(s) to one of the two permanent Instrument House enclosures.
5. Open Tube Piezometers C-18 thru C-21 are retrofitted with a 1/2" diameter Vibrating Wire Transducer for the purpose of remote sensing the water levels in these instruments from Instrument House IH-2. The method and timing for each installation shall be approved by the Government Representative in the field.

LITTLE DELL PROJECT: PL-44 (LDIKE2RO.DWG) (EMB) 25 MAY 94 NLB



F INSTALLATION	REMARKS
ING WIRE/EMB.	INSTALLED WITH VW-13.
ING WIRE/EMB.	INSTALLED WITH VW-12.
ING WIRE/EMB.	INSTALLED WITH VW-15. Spliced 10-92 @ Sta. 15+57, 48.8 ft. u/s, el. 5791 ft.
ING WIRE/EMB.	INSTALLED WITH VW-14.
ING WIRE/FND.	INSTALLED WITH VW-17. A steel tamping tool was lost in this installation at el. 5565.9 ft. Spliced 11-21-92 at Instrument House IH-1
ING WIRE/FND.	INSTALLED WITH VW-16. A steel tamping tool was lost in this installation at el. 5565.9 ft. Spliced 11-21-92 @ Sta. 15+50, 5 ft. d/s, el. 5810 ft.
ING WIRE/EMB.	INSTALLED WITH VW-19. Spliced 11-22-92 @ Instrument House IH-1
ING WIRE/EMB.	INSTALLED WITH VW-18. Spliced 11-22-92 @ Instrument House IH-1
ING WIRE/EMB.	INSTALLED WITH VW-21. Spliced 11-21-92 @ Instrument House IH-1
ING WIRE/EMB.	INSTALLED WITH VW-20. Spliced 11-21-92 @ Instrument House IH-1
ING WIRE/FND.	INSTALLED WITH VW-23. Spliced 11-21-92 @ Sta. 15+50, 5 ft. d/s, el. 5810 ft.
ING WIRE/FND.	INSTALLED WITH VW-22. Spliced 11-22-92 @ Sta. 15+50, axis, el. 5810 ft.
ING WIRE/EMB.	INSTALLED WITH VW-25. Spliced 10-23-92 @ Sta. 15+61, 37 ft. d/s, el. 5799 ft.
ING WIRE/EMB.	INSTALLED WITH VW-24. Spliced 10-23-92 @ Sta. 15+57, 30 ft. d/s, el. 5801 ft.
IRE WITH OPEN TUBE/FND.	INSTALLED WITH C-5. Spliced 10-23-92 @ Sta. 15+52, 12 ft. d/s, el. 5810 ft.
'ADDED IN EMB.	INSTALLED ALONE.
IRE WITH OPEN TUBE/FND.	*** NON FUNCTIONAL *** – Open tube was damaged by settlement of the embankment during construction.
'ADDED IN EMB.	INSTALLED ALONE. Retrofitted VWP wire spliced 11-22-92 @ Sta. 15+50, 10 ft. d/s, el. 5810 ft.
'FND.	INSTALLED ALONE. Retrofitted VWP wire spliced 11-21-92 @ Sta. 15+50, 5 ft. d/s, el. 5810 ft.
	INSTALLATION OKAY. Spliced 07-30-91 @ el. 5617.4 ft.
	INSTALLATION OKAY.
	INSTALLATION OKAY. Inclinometer was installed with internal grooves skewed 18.6 degrees clockwise from dam axis.
	INSTALLED AT STA. 14+38. OW-2 placed in lowest spot of drainage 628 ft. d/s of axis. Retro. VWP wire spliced 09-22-92 @ Sta. 15+56, 90 ft. d/s, el. 5779 ft.

INSTRUMENT LEGEND

SYMBOL	INSTRUMENT TYPE
I-6	INCLINOMETER
C-1	OPEN TUBE PIEZOMETER
OW-1	OBSERVATION WELL
VW-2	VIBRATING WIRE PIEZOMETER
VW-11 C-2	VIBRATING WIRE AND OPEN TUBE PIEZOMETERS
	VIBRATING WIRE PIEZOMETER CABLE (LEADLINE) ROUTE

GRAPHIC SCALE

50 0 50 100 150 200 250 FEET

SCALE: 1" = 150 FEET

LITTLE DELL LAKE
SALT LAKE CITY STREAMS, UTAH

INSTRUMENTATION SECTION

STATION 15+50

DEPARTMENT OF THE ARMY
SACRAMENTO DISTRICT, CORPS OF ENGINEERS
SACRAMENTO, CALIFORNIA

SUBMITTED: MICHAEL D. RAMSBOTHAM

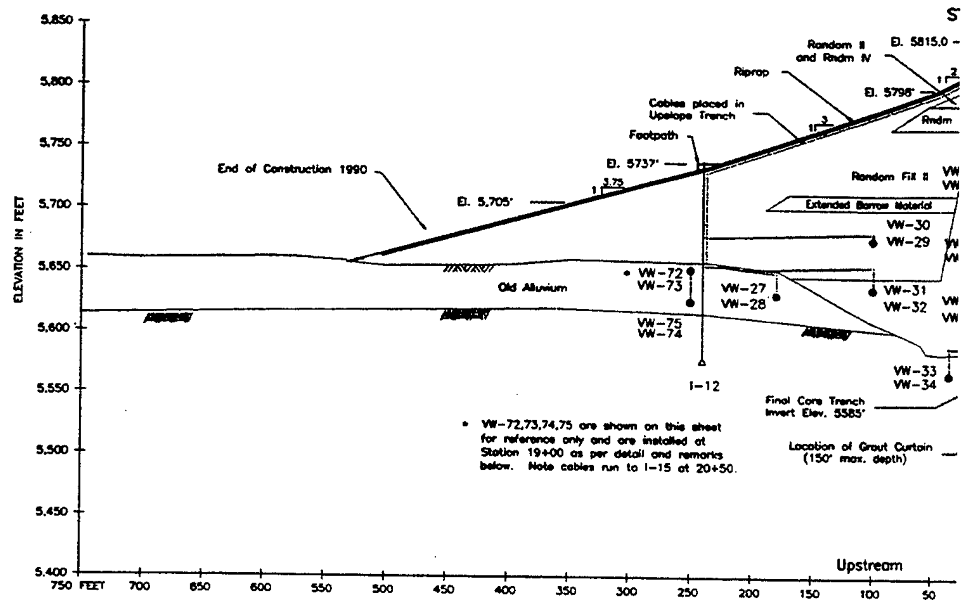
SUBMITTED: RESIDENT ENGINEER

DRAWN BY: J. ROADIFER

CHECKED BY: M. D. R.

PLATE 44

2



NAME	TYPE	STATION	DAM AXIS OFFSET	TIP ELEV. IN FEET	MATERIAL TYPE	INSTALLATION FILL ELEV.	METHOD OF INSTALLATION (DETAIL)
VW-27	VIBRATING WIRE PIEZO	18+00	180 U/S	5634.0	OLD ALLUVIUM	5651.7	SINGLE PAIR VIBRATING WIRE/FND.
VW-28	VIBRATING WIRE PIEZO	18+00	180 U/S	5633.4	OLD ALLUVIUM	5651.7	SINGLE PAIR VIBRATING WIRE/FND.
VW-29	VIBRATING WIRE PIEZO	18+00	100 U/S	5674.3	RANDOM FILL II	5679.2	SINGLE PAIR VIBRATING WIRE/EMB.
VW-30	VIBRATING WIRE PIEZO	18+00	100 U/S	5675.1	RANDOM FILL II	5679.2	SINGLE PAIR VIBRATING WIRE/EMB.
VW-31	VIBRATING WIRE PIEZO	18+00	100 U/S	5635.8	CORE	5652.1	SINGLE PAIR VIBRATING WIRE/EMB.
VW-32	VIBRATING WIRE PIEZO	18+00	100 U/S	5635.0	CORE	5652.1	SINGLE PAIR VIBRATING WIRE/EMB.
VW-33	VIBRATING WIRE PIEZO	18+00	35 U/S	5567.0	BEDROCK, U/S FROM GROUT CURTAIN	5591.1	SINGLE PAIR VIBRATING WIRE/FND.
VW-34	VIBRATING WIRE PIEZO	18+00	35 U/S	5566.4	BEDROCK, U/S FROM GROUT CURTAIN	5591.1	SINGLE PAIR VIBRATING WIRE/FND.
VW-35	VIBRATING WIRE PIEZO	18+00	5 D/S	5726.4	CORE	5729.9	SINGLE PAIR VIBRATING WIRE/CORE
VW-36	VIBRATING WIRE PIEZO	18+00	5 D/S	5725.6	CORE	5729.9	SINGLE PAIR VIBRATING WIRE/CORE
VW-37	VIBRATING WIRE PIEZO	18+00	5 D/S	5666.1	CORE	5670.6	SINGLE PAIR VIBRATING WIRE/CORE
VW-38	VIBRATING WIRE PIEZO	18+00	5 D/S	5665.3	CORE	5670.6	SINGLE PAIR VIBRATING WIRE/CORE
VW-39	VIBRATING WIRE PIEZO	18+00	5 D/S	5615.9	CORE	5620.6	SINGLE PAIR VIBRATING WIRE/CORE
VW-40	VIBRATING WIRE PIEZO	18+00	5 D/S	5615.2	CORE	5620.6	SINGLE PAIR VIBRATING WIRE/CORE
VW-41	VIBRATING WIRE PIEZO	18+00	15 D/S	5566.0	BEDROCK, D/S FROM GROUT CURTAIN	5586.4	SINGLE PAIR VIBRATING WIRE/FND.
VW-42	VIBRATING WIRE PIEZO	18+00	15 D/S	5566.6	BEDROCK, D/S FROM GROUT CURTAIN	5586.4	SINGLE PAIR VIBRATING WIRE/FND.
VW-43	VIBRATING WIRE PIEZO	18+04	304 D/S	5611.2	OLD ALLUVIUM	5626.5	SINGLE VIBRATING WIRE WITH OPEN TUBE/
VW-44	VIBRATING WIRE PIEZO	18+02	306 D/S	5581.7	BEDROCK	5626.0	SINGLE VIBRATING WIRE WITH OPEN TUBE/
C-8	OPEN TUBE PIEZO	18+00	305 D/S	5655.0	RANDOM FILL I	5655.0	SINGLE OPEN TUBE/ADDED IN EMB.
C-9	OPEN TUBE PIEZO	18+04	304 D/S	5610.0	OLD ALLUVIUM	5626.5	SINGLE VIBRATING WIRE WITH OPEN TUBE/
C-10	OPEN TUBE PIEZO	18+02	306 D/S	5580.5	BEDROCK	5626.0	SINGLE VIBRATING WIRE WITH OPEN TUBE/
C-11	OPEN TUBE PIEZO	18+00	650 D/S	5620.0	OLD ALLUVIUM	5628.2	SINGLE OPEN TUBE/2 PER BOREHOLE/FNI
C-12	OPEN TUBE PIEZO	18+00	650 D/S	5580.9	OLD ALLUVIUM	5628.2	SINGLE OPEN TUBE/2 PER BOREHOLE/FNI
I-12	INCLINOMETER	18+00	240 U/S	5580.0	BEDROCK	5656.2	INCLINOMETER
I-13	INCLINOMETER	18+00	0	5560.0	BEDROCK	5585.3	INCLINOMETER
I-14	INCLINOMETER	18+00	300 D/S	5566.0	BEDROCK	5625.5	INCLINOMETER
VW-72	VIBRATING WIRE PIEZO	19+00	250 U/S	5651.2	OLD ALLUVIUM	5662.1	SINGLE PAIR VIBRATING WIRE/FND.
VW-73	VIBRATING WIRE PIEZO	19+00	250 U/S	5650.6	OLD ALLUVIUM	5662.1	SINGLE PAIR VIBRATING WIRE/FND.
VW-74	VIBRATING WIRE PIEZO	19+00	250 U/S	5625.2	OLD ALLUVIUM	5662.1	SINGLE PAIR VIBRATING WIRE/FND.
VW-75	VIBRATING WIRE PIEZO	19+00	250 U/S	5625.8	OLD ALLUVIUM	5662.1	SINGLE PAIR VIBRATING WIRE/FND.

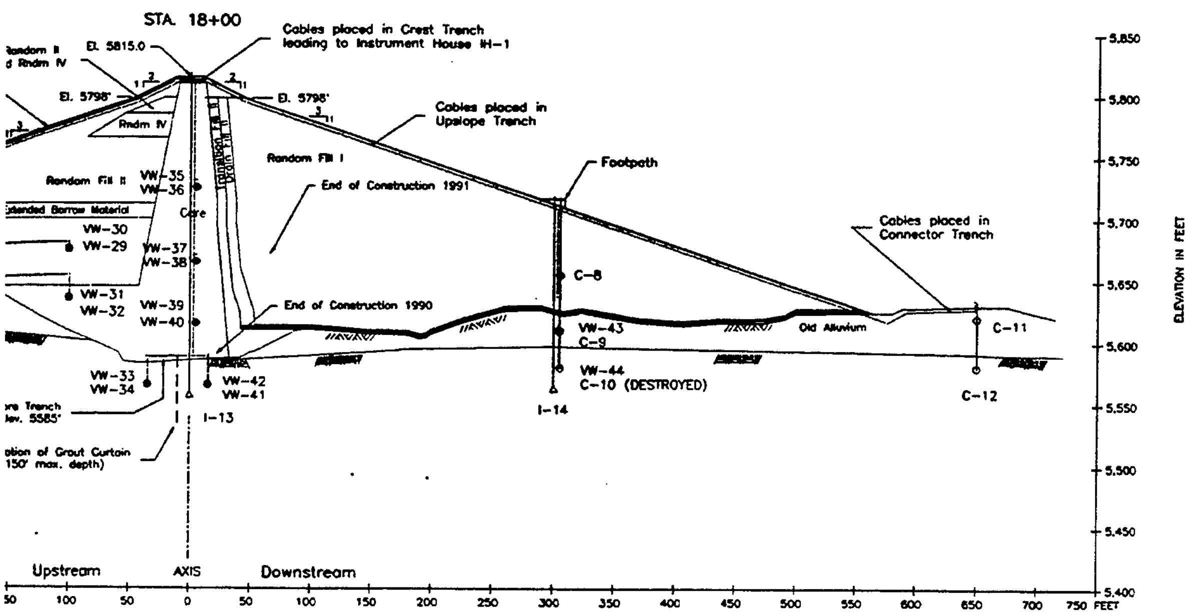
INSTRUMENT

SYMBOL	INSTRU
I-6	INCLINOI
C-1	OPEN TU
OW-1	OBSERV
VW-2	VIBRATIN
VW-11 C-2	VIBRATIN TUBE PII
	VIBRATINC CABLE (L

Notes:

1. All instrument cables routed in trenches are placed with approximately 10 feet of slack length for every 100 feet of trench
2. The term "Connector Trench" refers to an excavated trench on the approximately horizontal fill surface to route the vibrating wire cables from the point of installation to the appropriate inclinometer instrument mound where they shall be advanced vertically with the fill.
3. The term "Upslope Trench" refers to an excavated trench on the final grade to route the vibrating wire cables from the instrument mound, upslope, to a manhole at the crest which shall serve as a junction for the cables and as an enclosure for an inclinometer located on the dam axis.
4. The term "Crest Trench" refers to an excavated trench on the dam crest prior to construction of the paved road to route the vibrating wire cables from the manhole junction(s) to one of the two permanent Instrument House enclosures.
5. Open Tube Piezometers C-18 thru C-21 are retrofitted with a 1/2" diameter Vibrating Wire Transducer for the purpose of remote sensing the water levels in these instruments from Instrument House IH-2. The method and timing for each installation shall be approved by the Government Representative in the field.

LITTLE DELL PROJECT: PL-45 (LDIXE3RO.DWG) (EMB) 25 MAY 94 NLB



STALLATION (DETAIL)	REMARKS
RATING WIRE/FND.	INSTALLED WITH VW-28. VWP Filter tip is high air entry. Spliced 10-06-92 @ Sta. 18+04, 38 ft. u/s, el. 5797 ft.
RATING WIRE/FND.	INSTALLED WITH VW-27. VWP filter tip is high air entry.
RATING WIRE/EMB.	INSTALLED WITH VW-30. Spliced 10-92 @ Sta. 18+00, 5 ft. d/s, el. 5810 ft.
RATING WIRE/EMB.	INSTALLED WITH VW-29. Spliced 10-92 @ Sta. 18+00, 2 ft. d/s, el. 5810 ft.
RATING WIRE/EMB.	INSTALLED WITH VW-32.
RATING WIRE/EMB.	INSTALLED WITH VW-31.
RATING WIRE/FND.	INSTALLED WITH VW-34.
RATING WIRE/FND.	INSTALLED WITH VW-33.
RATING WIRE/CORE	INSTALLED WITH VW-36.
RATING WIRE/CORE	INSTALLED WITH VW-35.
RATING WIRE/CORE	INSTALLED WITH VW-38.
RATING WIRE/CORE	INSTALLED WITH VW-37.
RATING WIRE/CORE	INSTALLED WITH VW-40. Spliced 11-18-92 @ approx. Sta. 15+90, Axis, 5810 ft.
RATING WIRE/CORE	INSTALLED WITH VW-39. Spliced 11-18-92 @ approx. Sta. 15+90, Axis, 5810 ft.
RATING WIRE/FND.	INSTALLED WITH VW-42. VWP filter tip is high air entry. Spliced 11-15-92 @ approx. Sta. 16+00, Axis, 5810 ft.
RATING WIRE/FND.	INSTALLED WITH VW-41. VWP filter tip is high air entry. Spliced 11-15-92 @ approx. Sta. 16+00, Axis, 5810 ft.
; WIRE WITH OPEN TUBE/FND.	INSTALLED WITH C-9. This instrument pair is not located in the same borehole as VW-44, C-10 as designed.
; WIRE WITH OPEN TUBE/FND.	INSTALLED WITH C-10.
BE/ADDED IN EMB.	INSTALLED ALONE.
; WIRE WITH OPEN TUBE/FND.	INSTALLED WITH VW-43. Open tube spliced @ el. 5640.6 ft.
; WIRE WITH OPEN TUBE/FND.	*** NON FUNCTIONAL *** - Open tube was damaged by settlement of the embankment during construction.
BE/2 PER BOREHOLE/FND.	INSTALLED ALONE. Spliced 10-92 @ Instrument House IH-1.
BE/2 PER BOREHOLE/FND.	INSTALLED ALONE.
	INSTALLATION OKAY.
	INSTALLATION OKAY. This inclinometer has only two 10 foot sections at bottom of hole. Spliced 04-21-92 @ elevation 5675.3 ft.
	INSTALLATION OKAY.
ATING WIRE/FND	INSTALLED WITH VW-73. Cables routed to Instrument House IH-2 through I-15 AT Sta. 20+50, 240 ft. U/S
ATING WIRE/FND.	INSTALLED WITH VW-72. Cables routed to Instrument House IH-2 through I-15 AT Sta. 20+50, 240 ft. U/S
ATING WIRE/FND.	INSTALLED WITH VW-75. Cables routed to Instrument House IH-2 through I-15 AT Sta. 20+50, 240 ft. U/S
ATING WIRE/FND.	INSTALLED WITH VW-74. Cables routed to Instrument House IH-2 through I-15 AT Sta. 20+50, 240 ft. U/S

INSTRUMENT LEGEND

SYMBOL	INSTRUMENT TYPE
I-6	INCLINOMETER
C-1	OPEN TUBE PIEZOMETER
OW-1	OBSERVATION WELL
VW-2	VIBRATING WIRE PIEZOMETER
VW-11 C-2	VIBRATING WIRE AND OPEN TUBE PIEZOMETERS
	VIBRATING WIRE PIEZOMETER CABLE (LEADLINE) ROUTE

GRAPHIC SCALE

50 0 50 100 150 200 250 FEET

SCALE: 1" = 150 FEET

LITTLE DELL LAKE
SALT LAKE CITY STREAMS, UTAH

INSTRUMENTATION SECTION

STATION 18+00

DEPARTMENT OF THE ARMY
SACRAMENTO DISTRICT, CORPS OF ENGINEERS
SACRAMENTO, CALIFORNIA

SUBMITTED: MICHAEL D. RAMSBOTHAM

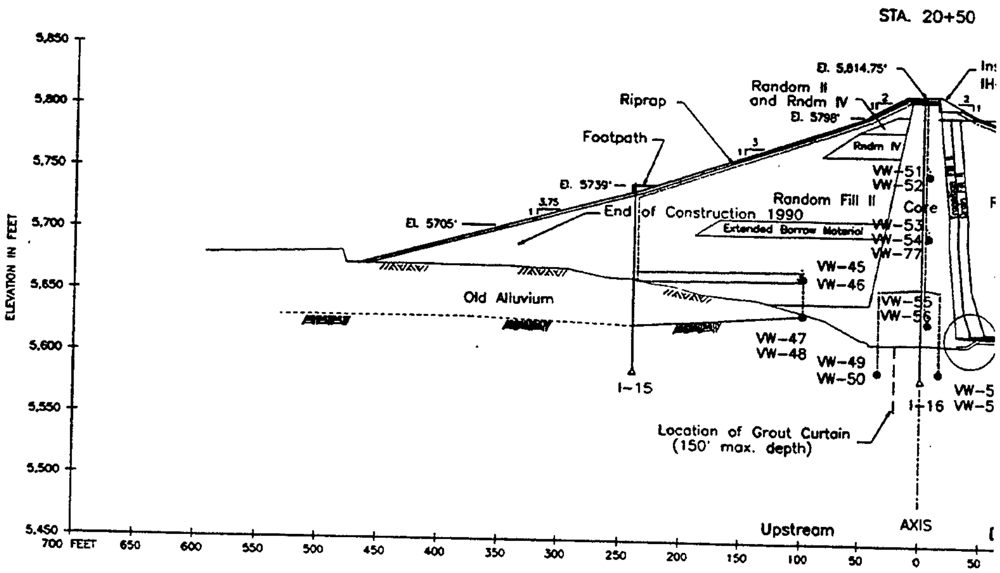
SUBMITTED: RESIDENT ENGINEER

DRAWN BY: J. ROADIFER

CHECKED BY: M D R

PLATE 45

2



NAME	TYPE	STATION	DAM AXIS OFFSET	TIP ELEV. IN FEET	MATERIAL TYPE	INSTALLATION FILL ELEV.	METHOD OF INSTALLATION	
VW-45	VIBRATING WIRE PIEZO	20+50	100 U/S	5665.8	RANDOM FILL II	5671.9	SINGLE PAIR VIBRATING WIRE/EMB.	INSTAL
VW-46	VIBRATING WIRE PIEZO	20+50	100 U/S	5665.0	RANDOM FILL II	5671.9	SINGLE PAIR VIBRATING WIRE/EMB.	INSTAL
VW-47	VIBRATING WIRE PIEZO	20+50	100 U/S	5636.7	OLD ALLUVIUM	5662.8	SINGLE PAIR VIBRATING WIRE/FND	INSTAL
VW-48	VIBRATING WIRE PIEZO	20+50	100 U/S	5637.3	OLD ALLUVIUM	5662.8	SINGLE PAIR VIBRATING WIRE/FND	INSTAL
VW-49	VIBRATING WIRE PIEZO	20+50	35 U/S	5593.4	BEDROCK, U/S FROM GROUT CURTAIN	5656.7	SINGLE PAIR VIBRATING WIRE/FND.	INSTAL
VW-50	VIBRATING WIRE PIEZO	20+50	35 U/S	5592.8	BEDROCK, U/S FROM GROUT CURTAIN	5656.7	SINGLE PAIR VIBRATING WIRE/FND.	INSTAL
VW-51	VIBRATING WIRE PIEZO	20+50	5 D/S	5753.0	CORE	5760.0	SINGLE PAIR VIBRATING WIRE/EMB.	INSTAL
VW-52	VIBRATING WIRE PIEZO	20+50	5 D/S	5753.8	CORE	5760.0	SINGLE PAIR VIBRATING WIRE/EMB.	INSTAL
VW-53	VIBRATING WIRE PIEZO	20+50	5 D/S	5700.1	CORE	5705.5	SINGLE PAIR VIBRATING WIRE/EMB.	INSTAL
VW-54	VIBRATING WIRE PIEZO	20+50	5 D/S	5700.9	CORE	5705.5	SINGLE PAIR VIBRATING WIRE/EMB.	INSTAL
VW-55	VIBRATING WIRE PIEZO	20+50	5 D/S	5630.6	CORE	5657.7	SINGLE PAIR VIBRATING WIRE/EMB	INSTAL
VW-56	VIBRATING WIRE PIEZO	20+50	5 D/S	5630.0	CORE	5657.7	SINGLE PAIR VIBRATING WIRE/EMB.	INSTAL
VW-57	VIBRATING WIRE PIEZO	20+50	15 D/S	5590.9	BEDROCK, D/S FROM GROUT CURTAIN	5658.5	SINGLE PAIR VIBRATING WIRE/FND.	INSTAL
VW-58	VIBRATING WIRE PIEZO	20+50	15 D/S	5590.3	BEDROCK, D/S FROM GROUT CURTAIN	5658.5	SINGLE PAIR VIBRATING WIRE/FND.	INSTAL
VW-59	VIBRATING WIRE PIEZO	20+50	305 D/S	5636.2	OLD ALLUVIUM	5655.4	SINGLE VIBRATING WIRE WITH OPEN TUBE/FND.	INSTAL
VW-60	VIBRATING WIRE PIEZO	20+50	305 D/S	5596.3	BEDROCK	5655.4	SINGLE VIBRATING WIRE WITH OPEN TUBE/FND.	INSTAL
C-13	OPEN TUBE PIEZO	20+50	305 D/S	5675.0	RANDOM FILL I	5675.0	SINGLE OPEN TUBE/ADDED IN EMB	INSTALL
C-14	OPEN TUBE PIEZO	20+50	305 D/S	5635.0	OLD ALLUVIUM	5655.4	SINGLE VIBRATING WIRE WITH OPEN TUBE/FND.	INSTALL
C-15	OPEN TUBE PIEZO	20+50	305 D/S	5595.2	BEDROCK	5655.4	SINGLE VIBRATING WIRE WITH OPEN TUBE/FND.	INSTALL
C-16	OPEN TUBE PIEZO	20+50	550 D/S	5639.8	OLD ALLUVIUM	5653.2	MULTIPLE OPEN TUBE/TOE	INSTALL
C-17	OPEN TUBE PIEZO	20+50	550 D/S	5610.3	BEDROCK	5653.2	MULTIPLE OPEN TUBE/TOE	INSTALL
I-15	INCLINOMETER	20+50	240 U/S	5590.7	BEDROCK	5663.7	INCLINOMETER	INSTALL
I-16	INCLINOMETER	20+50	0	5583.2	BEDROCK	5655.0	INCLINOMETER	INSTALL
I-17	INCLINOMETER	20+50	300 D/S	5584.9	BEDROCK	5654.9	INCLINOMETER	INSTALL
VW-77	VIBRATING WIRE PIEZO	20+55	5 D/S	5699.4	CORE	5760.0	HIGH AIR ENTRY FILTER; DIRECT BURIAL VWP	INSTALL

Notes:

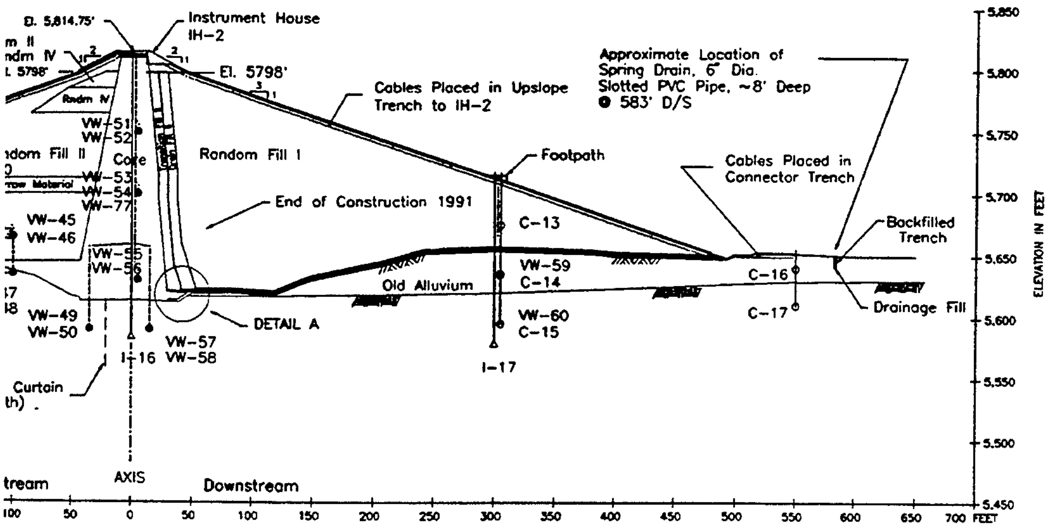
1. All instrument cables routed in trenches are placed with approximately 10 feet of slack length for every 100 feet of trench.
2. The term "Connector Trench" refers to an excavated trench on the approximately horizontal fill surface to route the vibrating wire cables from the point of installation to the appropriate inclinometer instrument mound where they shall be advanced vertically with the fill.
3. The term "Upslope Trench" refers to an excavated trench on the final grade to route the vibrating wire cables from the instrument mound, upslope, to a manhole at the crest which shall serve as a junction for the cables and as an enclosure for an Inclinometer located on the dam Axis.
4. The term "Crest Trench" refers to an excavated trench on the dam crest prior to construction of the paved road to route the vibrating wire cables from the manhole junction(s) to one of the two permanent Instrument House enclosures
5. Open Tube Piezometers C-18 thru C-21 are retrofitted with a 1/2" diameter Vibrating Wire Transducer for the purpose of remote sensing the water levels in these instruments from Instrument House IH-2. The method and timing for each installation shall be approved by the Government Representative in the field.

INSTRUMENT L

SYMBOL		INSTRUM
	I-6	INCLINOME
	C-1	OPEN TUB
	OW-1	OBSERVATI
	VW-2	VIBRATING
	VW-11 C-2	VIBRATING TUBE PIEZ
		VIBRATING CABLE (LEA

LITTLE DELL PROJECT: PL-46 (LDIXE4RO.DWG) (EMB) 25 MAY 94 NLB

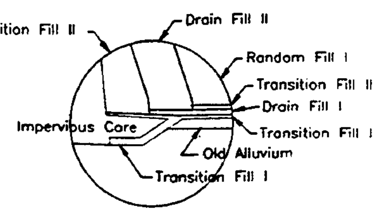
STA. 20+50



ATION	REMARKS
WIRE/EMB.	INSTALLED WITH VW-46. Spliced 10-13-92 @ Sta. 20+54, 14 ft. u/s, el. 5808 ft.
WIRE/EMB.	INSTALLED WITH VW-45. Spliced 10-13-92 @ Sta. 20+55, 16 ft. u/s, el. 5808 ft.
WIRE/FND	INSTALLED WITH VW-48.
WIRE/FND	INSTALLED WITH VW-47.
WIRE/FND.	INSTALLED WITH VW-50.
WIRE/FND.	INSTALLED WITH VW-49.
WIRE/EMB.	INSTALLED WITH VW-52.
WIRE/EMB.	INSTALLED WITH VW-51.
WIRE/EMB.	INSTALLED WITH VW-54 AND IN CONJUNCTION WITH VW-77.
WIRE/EMB.	INSTALLED WITH VW-53 AND IN CONJUNCTION WITH VW-77.
WIRE/EMB	INSTALLED WITH VW-56.
WIRE/EMB.	INSTALLED WITH VW-55.
WIRE/FND.	INSTALLED WITH VW-58.
WIRE/FND.	INSTALLED WITH VW-57.
WITH OPEN TUBE/FND.	INSTALLED WITH C-14.
WITH OPEN TUBE/FND.	INSTALLED WITH C-15.
ED IN EMB	INSTALLED ALONE.
WITH OPEN TUBE/FND.	INSTALLED WITH VW-59.
WITH OPEN TUBE/FND.	INSTALLED WITH VW-60. Open tube piezometer damaged by settlement of the embankment. Retro. VWP is still functional but not removable.
OE	INSTALLED ALONE. Spliced 11-14-92 @ Sta. 20+50, 8 ft. d/s, el. 5810 ft.
OE	INSTALLED ALONE. Spliced 11-14-92 @ Sta. 20+50, 13 ft. d/s, el. 5812 ft.
	INSTALLATION OKAY.
	INSTALLATION OKAY.
	INSTALLATION OKAY.
DIRECT BURIAL VWP	INSTALLED IN CONJUNCTION WITH VW-53, 54. For comparison of pore pressures between contract installation and direct burial methods.

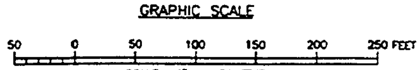
INSTRUMENT LEGEND

SYMBOL		INSTRUMENT TYPE
△	I-6	INCLINOMETER
○	C-1	OPEN TUBE PIEZOMETER
⊗	OW-1	OBSERVATION WELL
●	VW-2	VIBRATING WIRE PIEZOMETER
	VW-11 C-2	VIBRATING WIRE AND OPEN TUBE PIEZOMETERS
		VIBRATING WIRE PIEZOMETER CABLE (LEADLINE) ROUTE



DETAIL A

GRAPHIC SCALE



SCALE: 1" = 150 FEET

LITTLE DELL LAKE
SALT LAKE CITY STREAMS, UTAH

INSTRUMENTATION SECTION
STATION 20+50

DEPARTMENT OF THE ARMY
SACRAMENTO DISTRICT, CORPS OF ENGINEERS
SACRAMENTO, CALIFORNIA

SUBMITTED: MICHAEL D. RAMSBOTHAM

SUBMITTED: RESIDENT ENGINEER

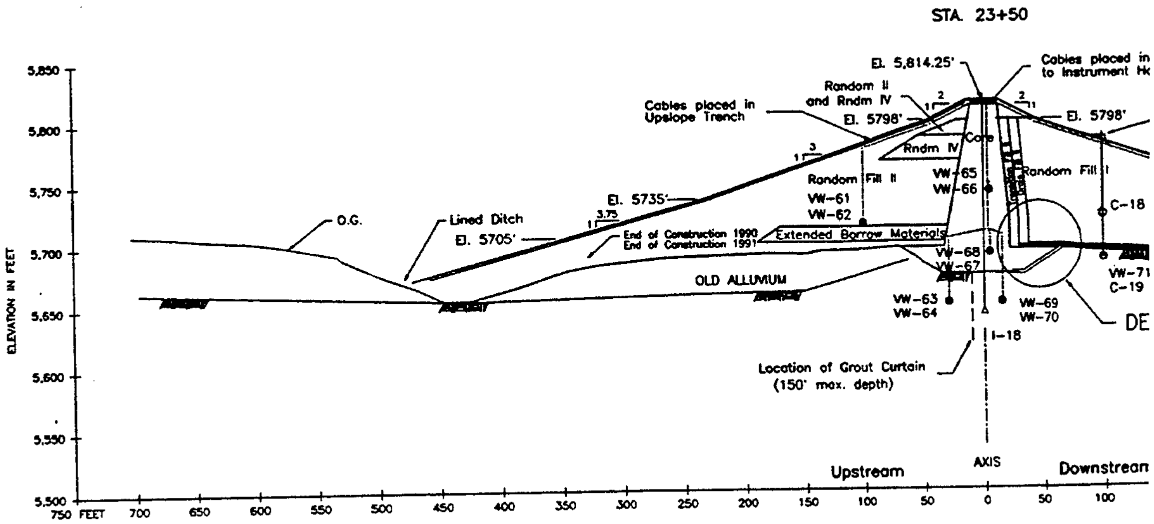
DRAWN BY: J. ROADIFER

CHECKED BY: M. D. R.

PLATE 46

(9)

STA. 23+50



INSTRUMENT INFORMATION

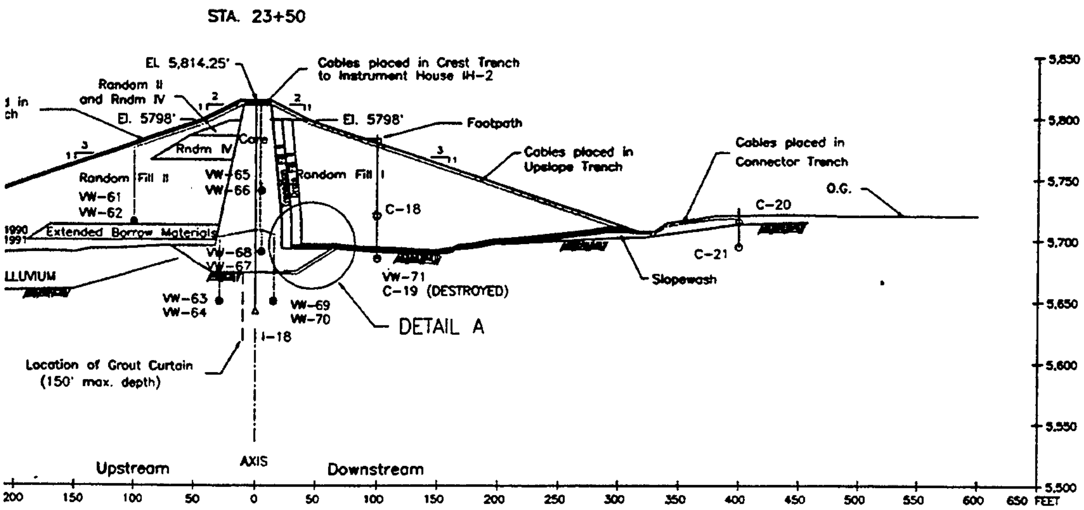
NAME	TYPE	STATION	DAM AXIS OFFSET	TIP ELEV. IN FEET	MATERIAL TYPE	INSTALLATION FILL ELEV.	METHOD OF INSTALLATION (DETAIL)	
VW-61	VIBRATING WIRE PIEZO	23+50	100 U/S	5716.2	RANDOM FILL II	5726.8	SINGLE PAIR VIBRATING WIRE/EMB.	INSTALLED WITH VW-62.
VW-62	VIBRATING WIRE PIEZO	23+50	100 U/S	5715.4	RANDOM FILL II	5726.8	SINGLE PAIR VIBRATING WIRE/EMB.	INSTALLED WITH VW-61.
VW-63	VIBRATING WIRE PIEZO	23+50	35 U/S	5651.1	BEDROCK, U/S FROM GROUT CURTAIN	5702.8	SINGLE PAIR VIBRATING WIRE/FND	INSTALLED WITH VW-64.
VW-64	VIBRATING WIRE PIEZO	23+50	35 U/S	5650.3	BEDROCK, U/S FROM GROUT CURTAIN	5702.8	SINGLE PAIR VIBRATING WIRE/FND	INSTALLED WITH VW-63.
VW-65	VIBRATING WIRE PIEZO	23+50	5 D/S	5741.5	CORE	5745.5	SINGLE PAIR VIBRATING WIRE/EMB.	INSTALLED WITH VW-66.
VW-66	VIBRATING WIRE PIEZO	23+50	5 D/S	5740.7	CORE	5745.5	SINGLE PAIR VIBRATING WIRE/EMB.	INSTALLED WITH VW-65.
VW-67	VIBRATING WIRE PIEZO	23+50	5 D/S	5690.0	CORE	5701.9	SINGLE PAIR VIBRATING WIRE/EMB.	INSTALLED WITH VW-68. H
VW-68	VIBRATING WIRE PIEZO	23+50	5 D/S	5690.8	CORE	5701.9	SINGLE PAIR VIBRATING WIRE/EMB.	INSTALLED WITH VW-67. H
VW-69	VIBRATING WIRE PIEZO	23+50	15 D/S	5650.8	BEDROCK, D/S FROM GROUT CURTAIN	5700.7	SINGLE PAIR VIBRATING WIRE/FND.	INSTALLED WITH VW-70.
VW-70	VIBRATING WIRE PIEZO	23+50	15 D/S	5650.0	BEDROCK, D/S FROM GROUT CURTAIN	5700.7	SINGLE PAIR VIBRATING WIRE/FND.	INSTALLED WITH VW-69.
VW-71	VIBRATING WIRE PIEZO	23+45	95 D/S	5681.0	BEDROCK	5719.2	SINGLE VIBRATING WIRE WITH OPEN TUBE/FND.	INSTALLED WITH C-19. This
C-18	OPEN TUBE PIEZO	23+50	100 D/S	5720.0	RANDOM FILL I	5720.0	OPEN TUBE PIEZO./ADDED IN EMB.	INSTALLED ALONE.
C-19	OPEN TUBE PIEZO	23+45	95 D/S	5679.7	BEDROCK	5719.2	SINGLE VIBRATING WIRE WITH OPEN TUBE/FND.	*** NON FUNCTIONAL *** –
C-20	OPEN TUBE PIEZO	23+50	400 D/S	5714.3	COLLUVIUM	5720.6	OPEN TUBE PIEZO./2 PER BOREHOLE	INSTALLED ALONE.
C-21	OPEN TUBE PIEZO	23+50	400 D/S	5694.9	BEDROCK	5720.6	OPEN TUBE PIEZO./2 PER BOREHOLE	INSTALLED ALONE.
I-18	INCLINOMETER	23+50	0	5645.5	BEDROCK	5701.2	INCLINOMETER	INSTALLATION OKAY. This

Notes:

1. All instrument cables routed in trenches are placed with approximately 10 feet of slack length for every 100 feet of trench.
2. The term "Connector Trench" refers to an excavated trench on the approximately horizontal fill surface to route the vibrating wire cables from the point of installation to the appropriate inclinometer instrument mound where they shall be advanced vertically with the fill.
3. The term "Upslope Trench" refers to an excavated trench on the final grade to route the vibrating wire cables from the instrument mound, upslope, to a manhole at the crest which shall serve as a junction for the cables and as an enclosure for an inclinometer located on the dam Axis.
4. The term "Crest Trench" refers to an excavated trench on the dam crest prior to construction of the paved road to route the vibrating wire cables from the manhole junction(s) to one of the two permanent Instrument House enclosures.
5. Open Tube Piezometers C-18 thru C-21 are retrofitted with a 1/2" diameter Vibrating Wire Transducer for the purpose of remote sensing the water levels in these instruments from Instrument House IH-2. The method and timing for each installation shall be approved by the Government Representative in the field.

INSTRUMENT LEGEND

SYMBOL	INSTRUMENT TYPE
I-6	INCLINOMETER
C-1	OPEN TUBE PIEZOMETER
OW-1	OBSERVATION WELL
VW-2	VIBRATING WIRE PIEZOMETER
VW-11 C-2	VIBRATING WIRE AND OPEN TUBE PIEZOMETERS
	VIBRATING WIRE PIEZOMETER CABLE (LEADLINE) ROUTE

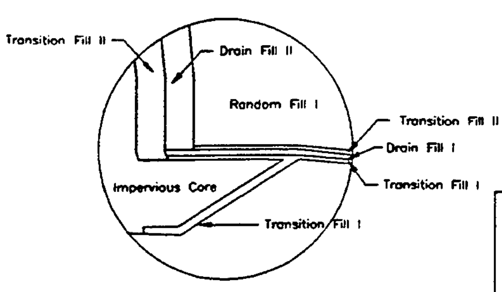


INSTRUMENT INFORMATION

INSTALLATION (DETAIL)	REMARKS
/IBRATING WIRE/EMB.	INSTALLED WITH VW-62.
/IBRATING WIRE/EMB.	INSTALLED WITH VW-61.
/IBRATING WIRE/FND	INSTALLED WITH VW-64.
/IBRATING WIRE/FND	INSTALLED WITH VW-63.
/IBRATING WIRE/EMB.	INSTALLED WITH VW-66.
/IBRATING WIRE/EMB.	INSTALLED WITH VW-65.
/IBRATING WIRE/EMB.	INSTALLED WITH VW-68. Hole was drilled by driving casing through core. This caused extremely high localized pore pressures.
/IBRATING WIRE/EMB.	INSTALLED WITH VW-67. Hole was drilled by driving casing through core. This caused extremely high localized pore pressures.
/IBRATING WIRE/FND.	INSTALLED WITH VW-70.
/IBRATING WIRE/FND.	INSTALLED WITH VW-69.
ING WIRE WITH OPEN TUBE/FND.	INSTALLED WITH C-19. This is the third VW-71 installed. Two installations were abandoned, one @ Sta. 23+50, 100 ft. d/s. and one @ Sta. 23+50, 95 ft. d/s.
IEZO./ADDED IN EMB	INSTALLED ALONE.
ING WIRE WITH OPEN TUBE/FND.	*** NON FUNCTIONAL *** – Open tube piezometer was damaged by settlement of the embankment during construction.
IEZO./2 PER BOREHOLE	INSTALLED ALONE.
IEZO./2 PER BOREHOLE	INSTALLED ALONE.
	INSTALLATION OKAY. This inclinometer only has 2 each 10 foot inclinometer sections at bottom of installation.

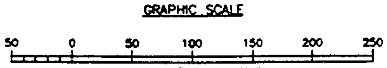
INSTRUMENT LEGEND

SYMBOL		INSTRUMENT TYPE
	I-6	INCLINOMETER
	C-1	OPEN TUBE PIEZOMETER
	OW-1	OBSERVATION WELL
	VW-2	VIBRATING WIRE PIEZOMETER
	VW-11 C-2	VIBRATING WIRE AND OPEN TUBE PIEZOMETERS
		VIBRATING WIRE PIEZOMETER CABLE (LEADLINE) ROUTE



DETAIL A

GRAPHIC SCALE



SCALE: 1" = 150 FEET

LITTLE DELL LAKE
SALT LAKE CITY STREAMS, UTAH

INSTRUMENTATION SECTION

STATION 23+50

DEPARTMENT OF THE ARMY
SACRAMENTO DISTRICT, CORPS OF ENGINEERS
SACRAMENTO, CALIFORNIA

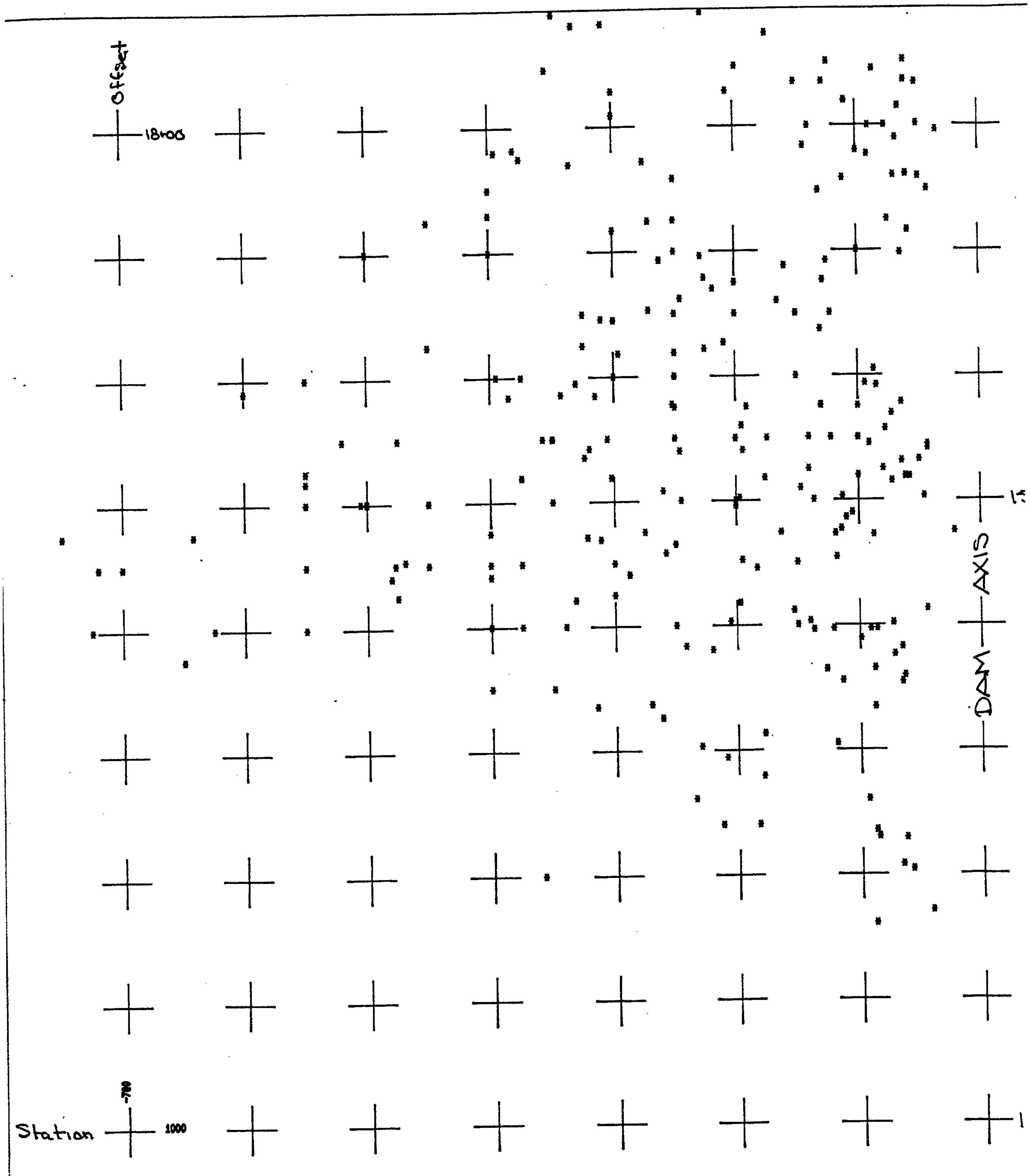
SUBMITTED:
MICHAEL D. RAMSBOTHAM

SUBMITTED:
RESIDENT ENGINEER

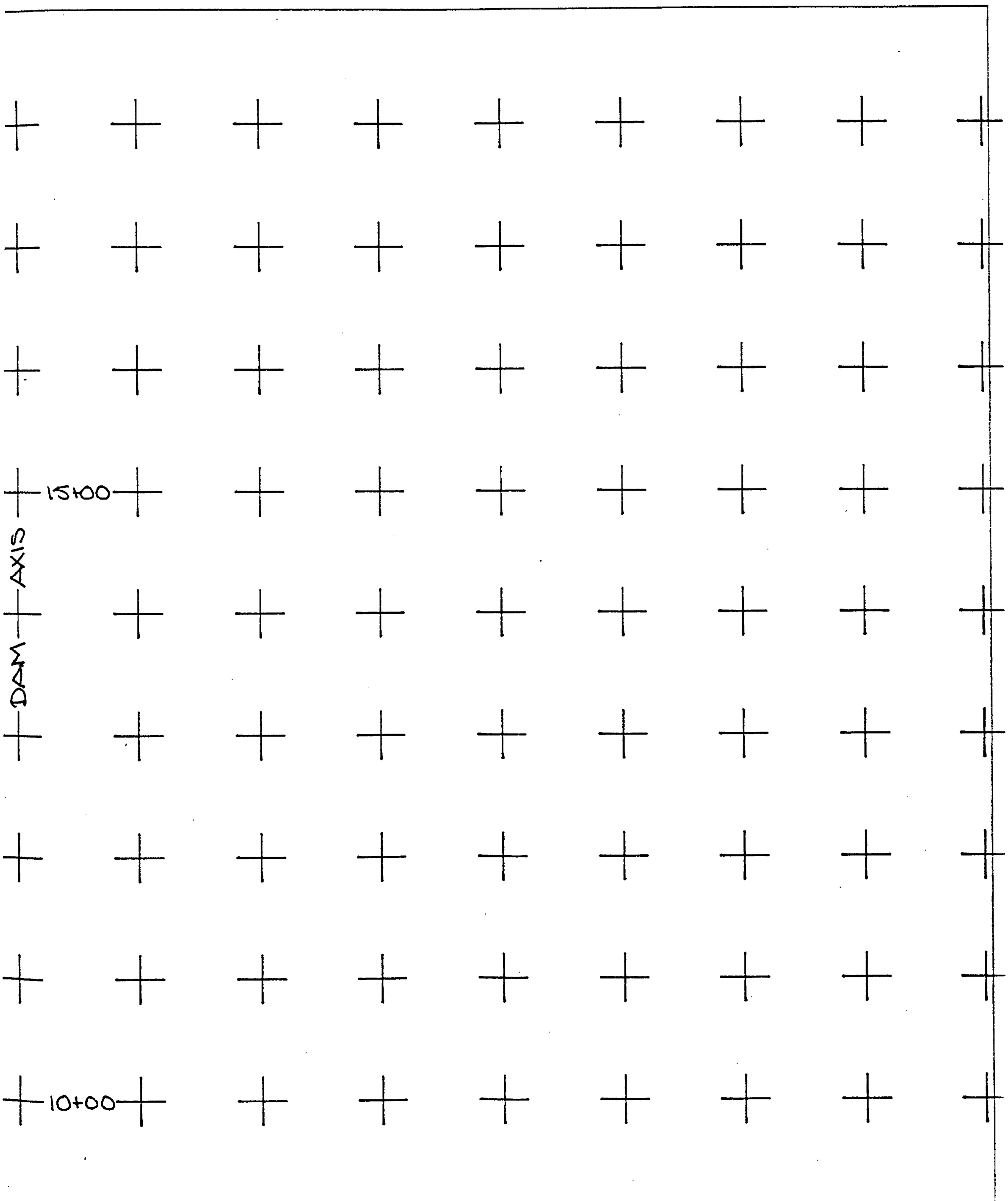
J. ROADIFER | M. D. R.

PLATE 47

2



RANDOMI D/S SHELL TEST LOCATIONS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DAM AXIS
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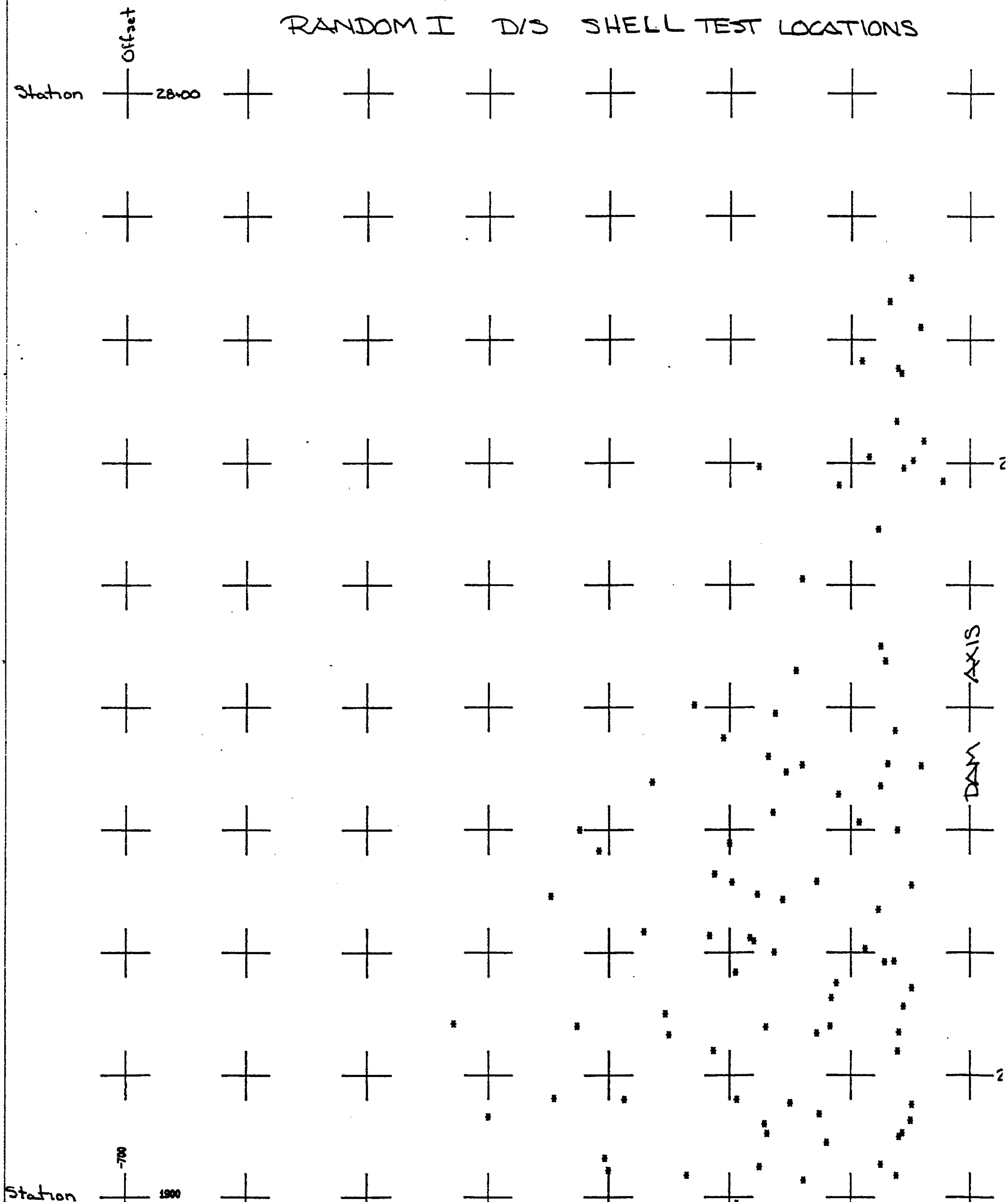

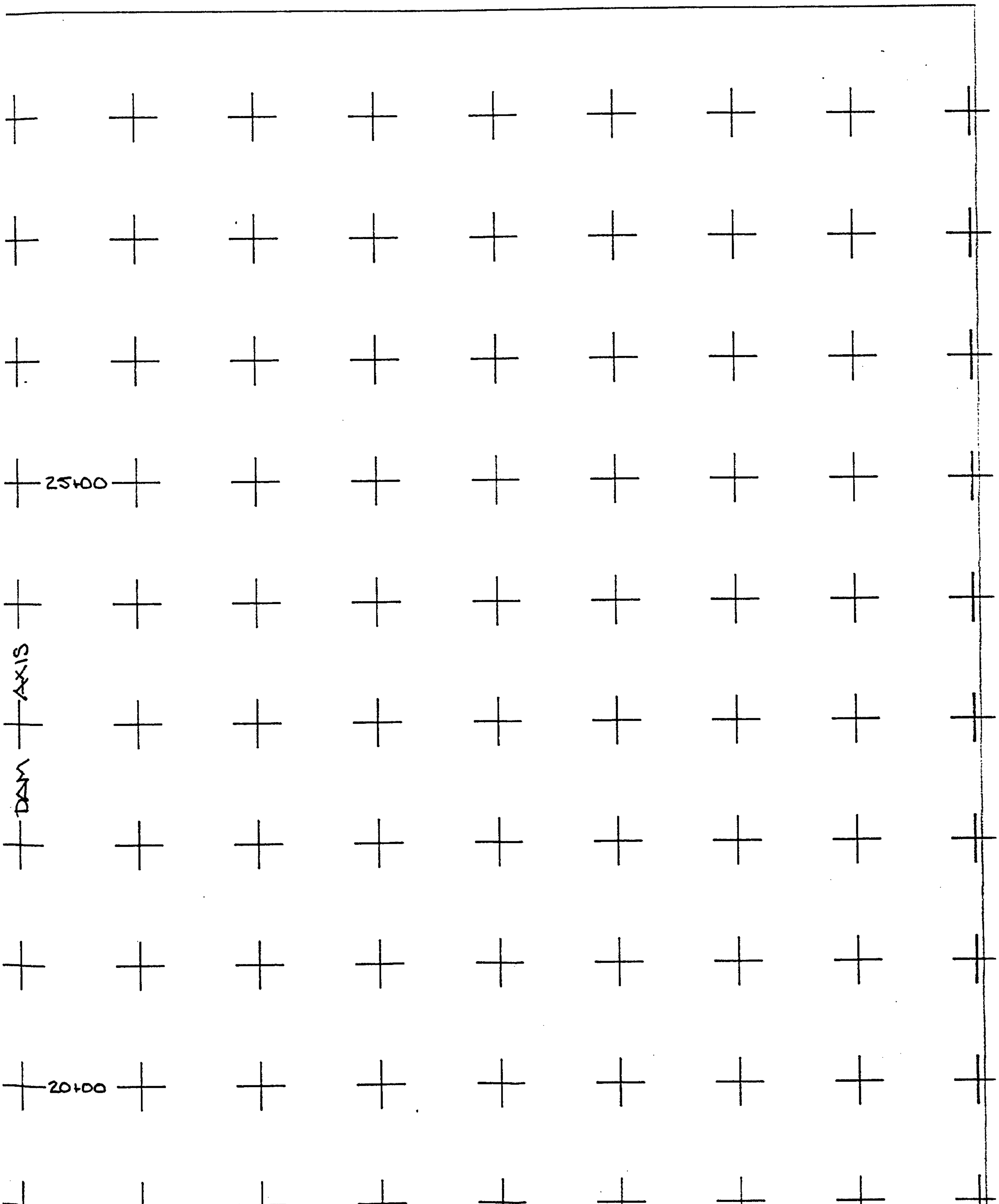
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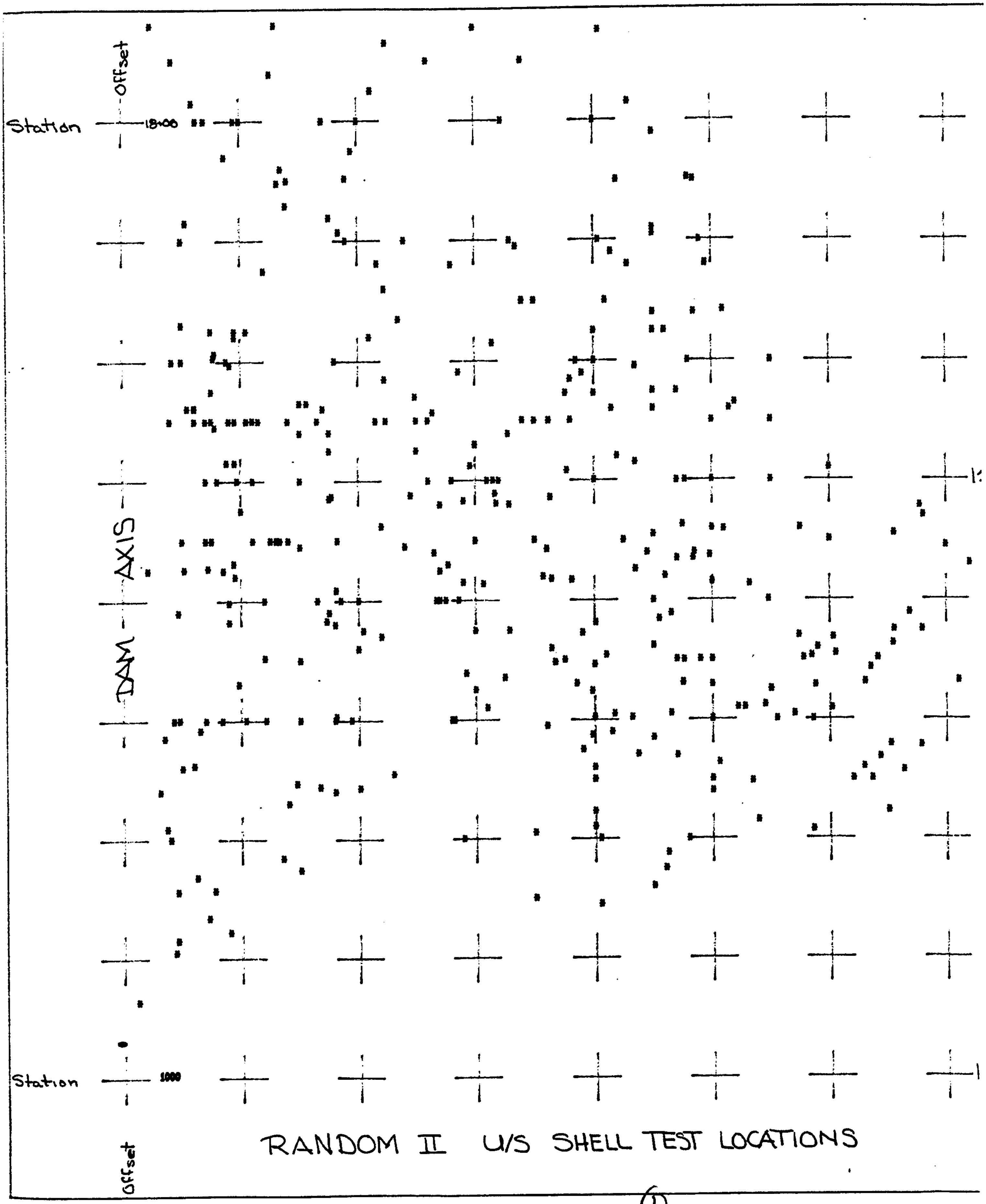
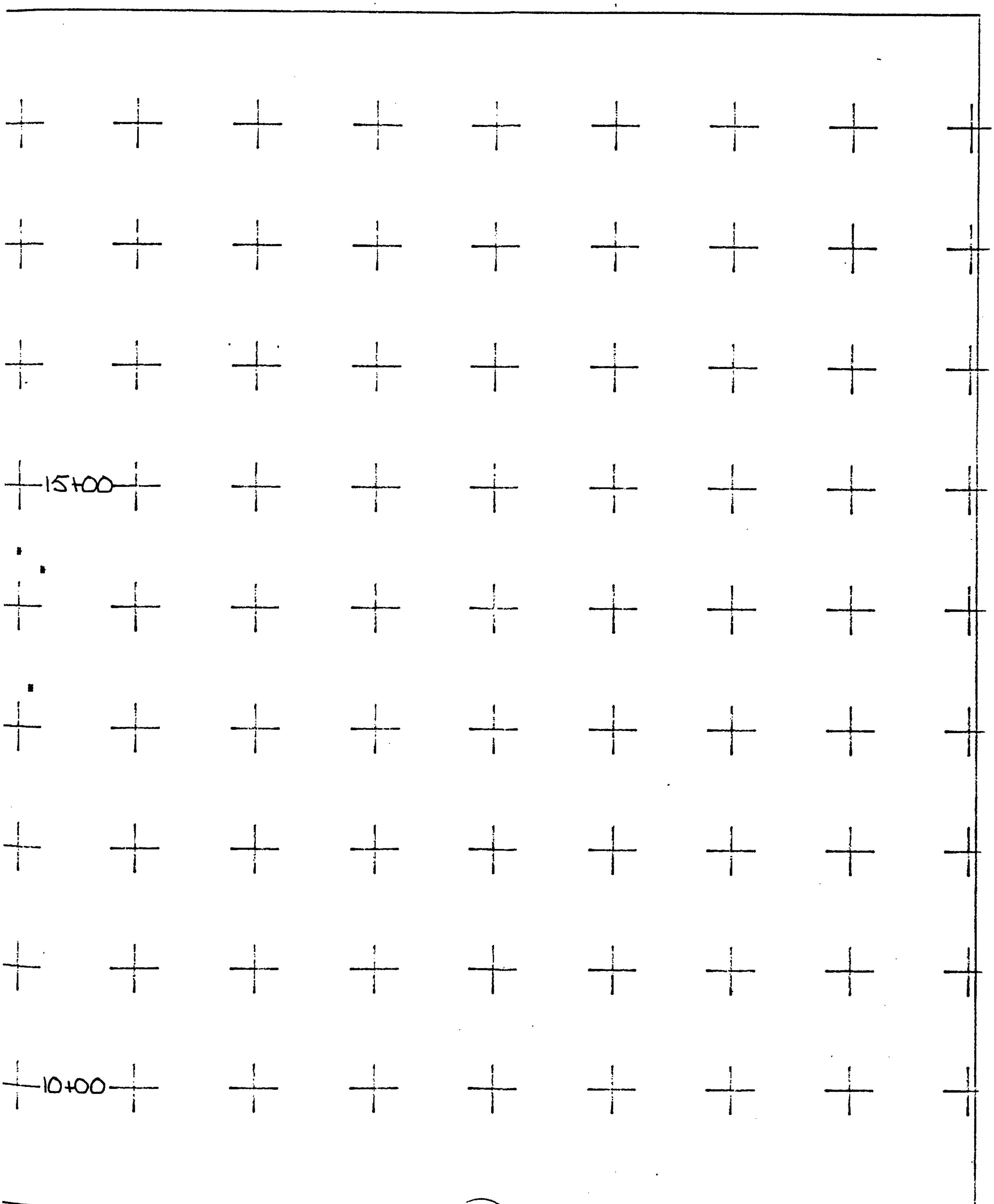


RANDOM II U/S SHELL TEST LOCATIONS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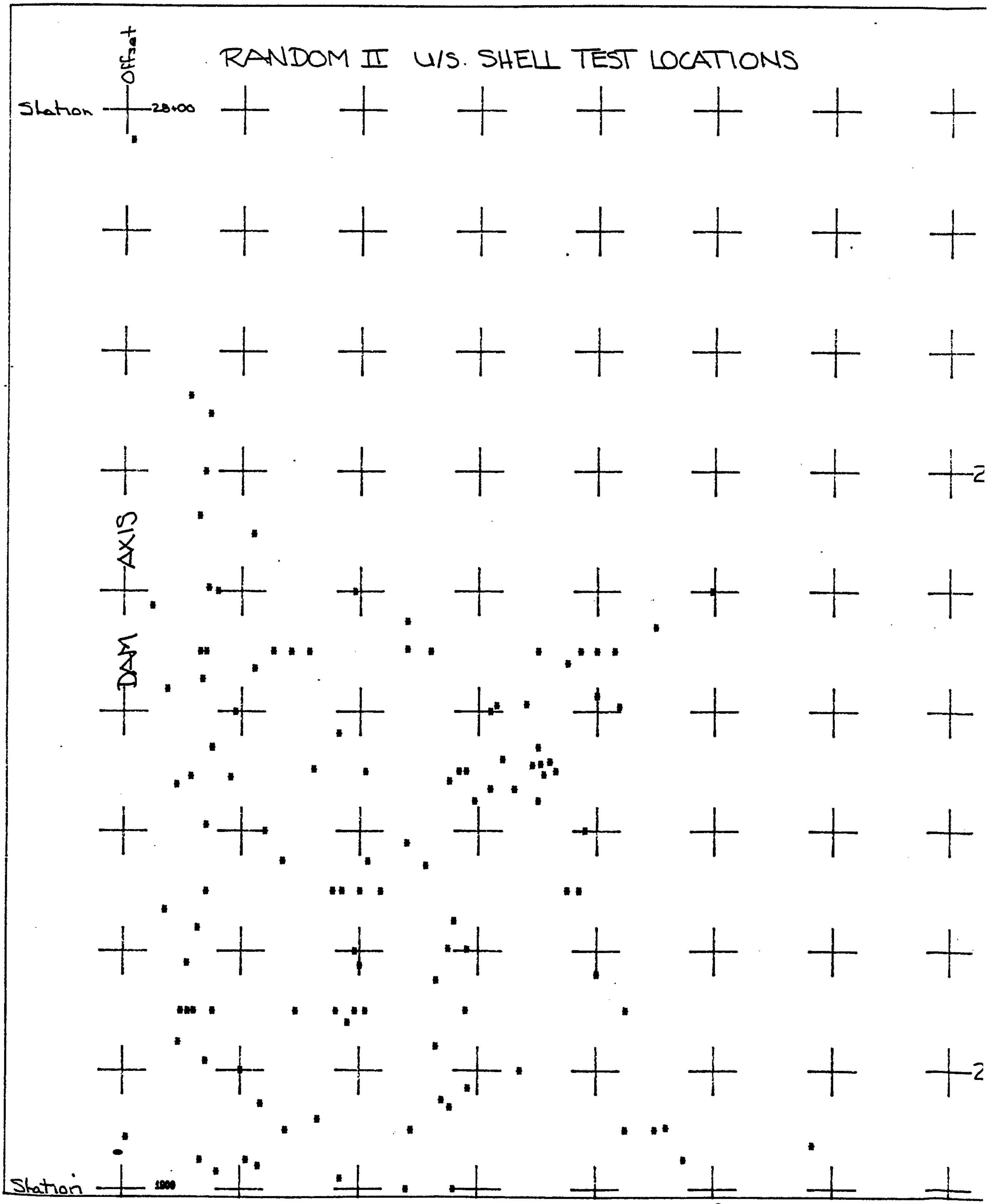
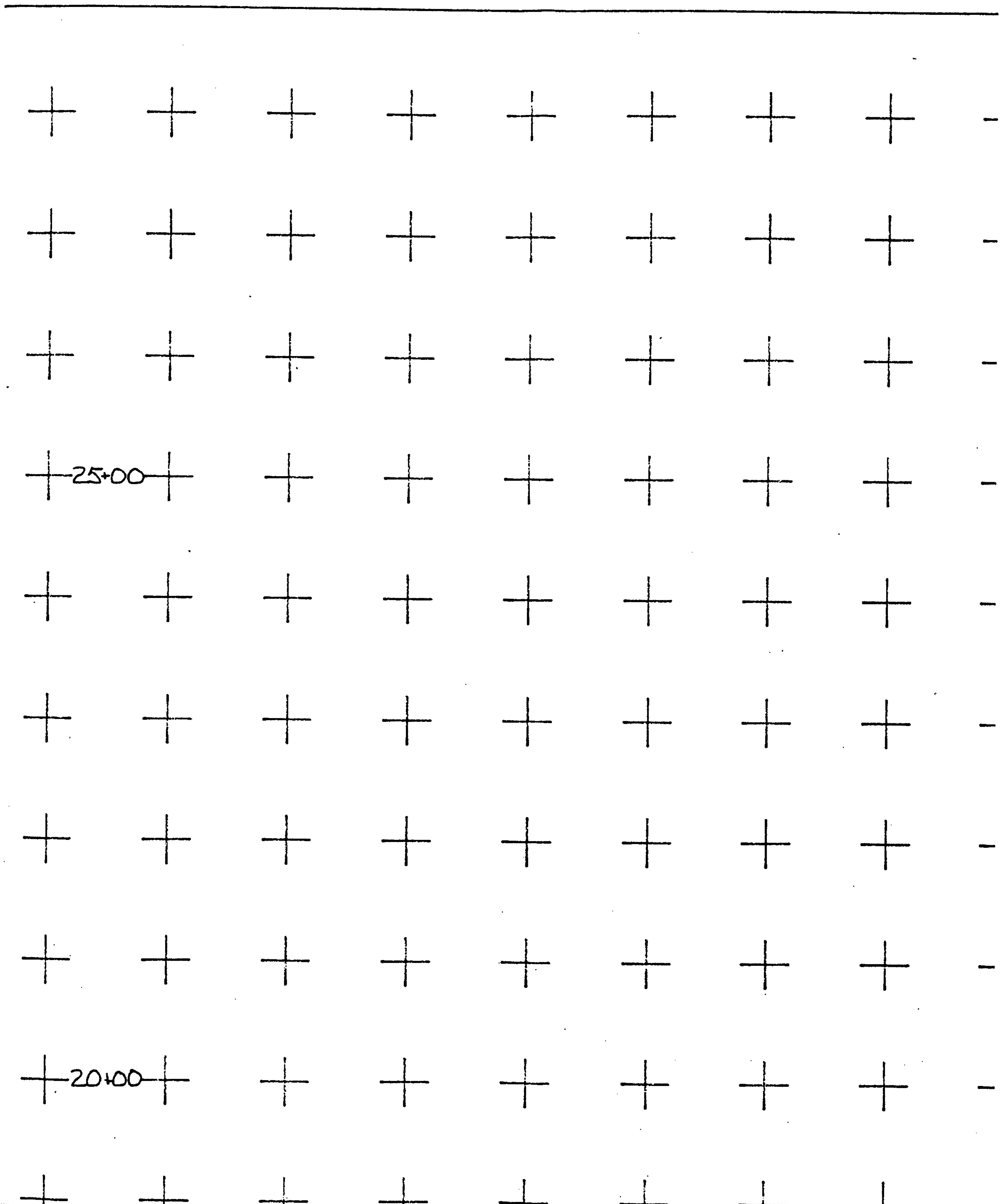

RANDOM II U/S. SHELL TEST LOCATIONS
Offset
Station
28+00
DAM AXIS
Station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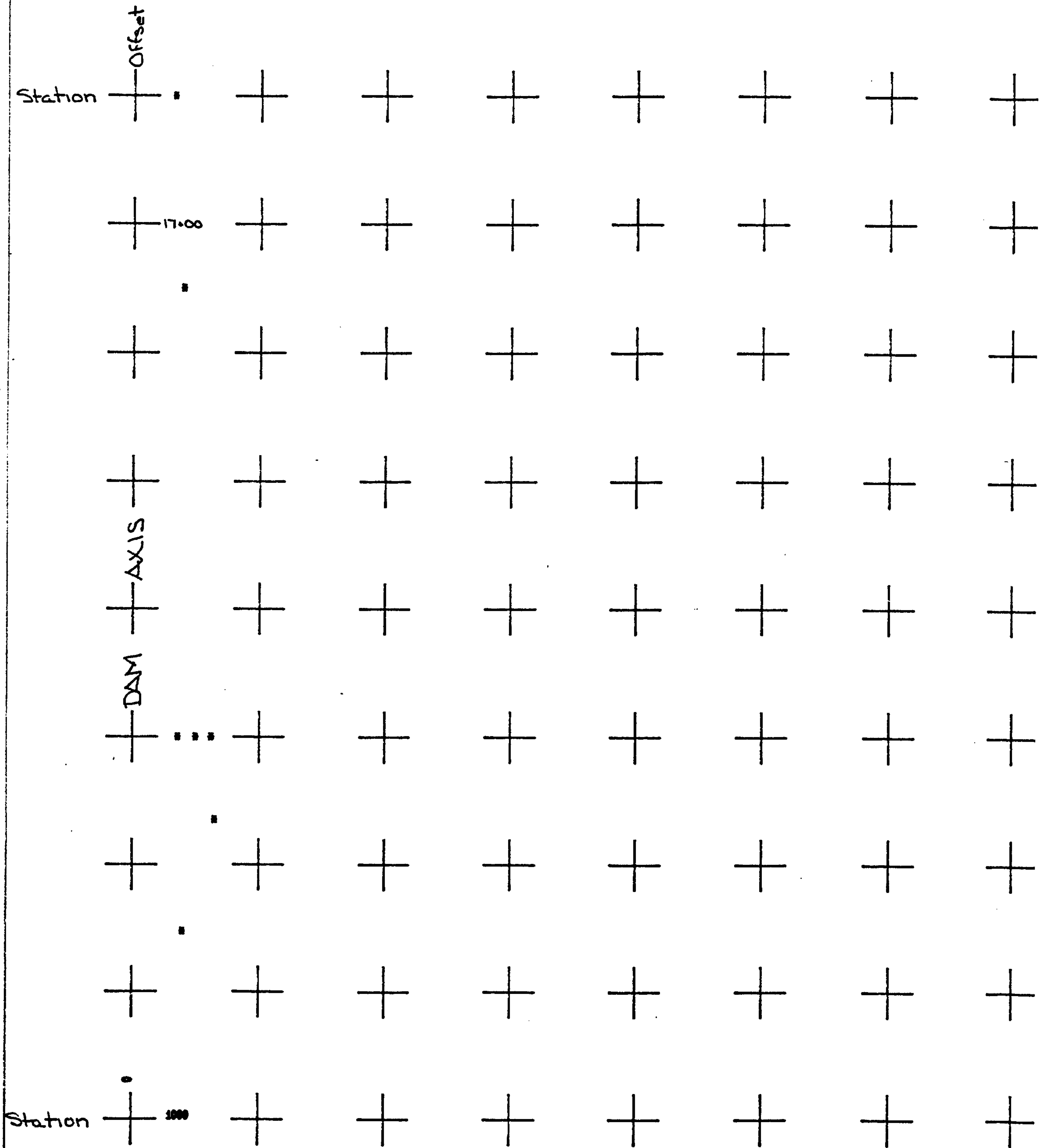

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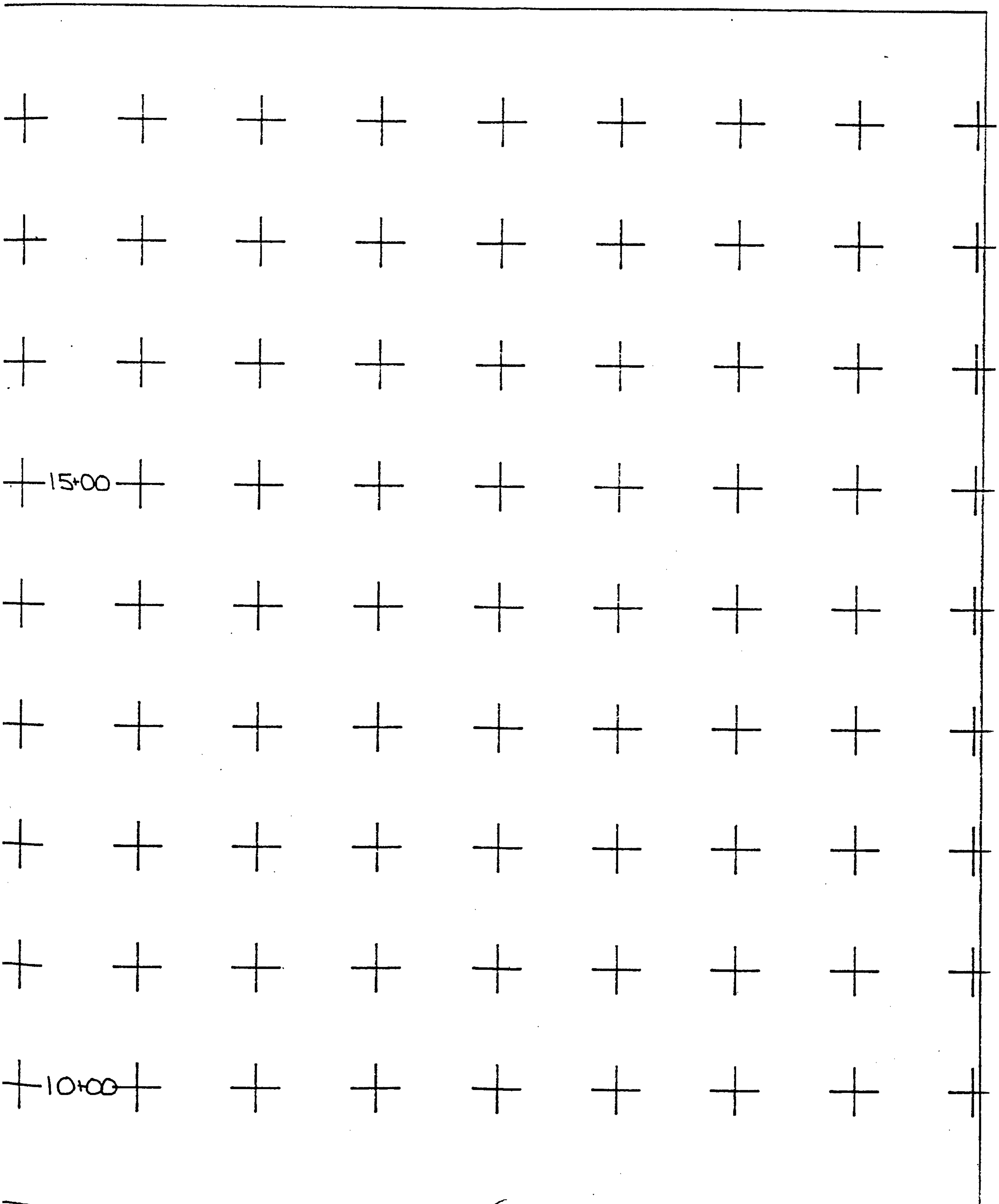
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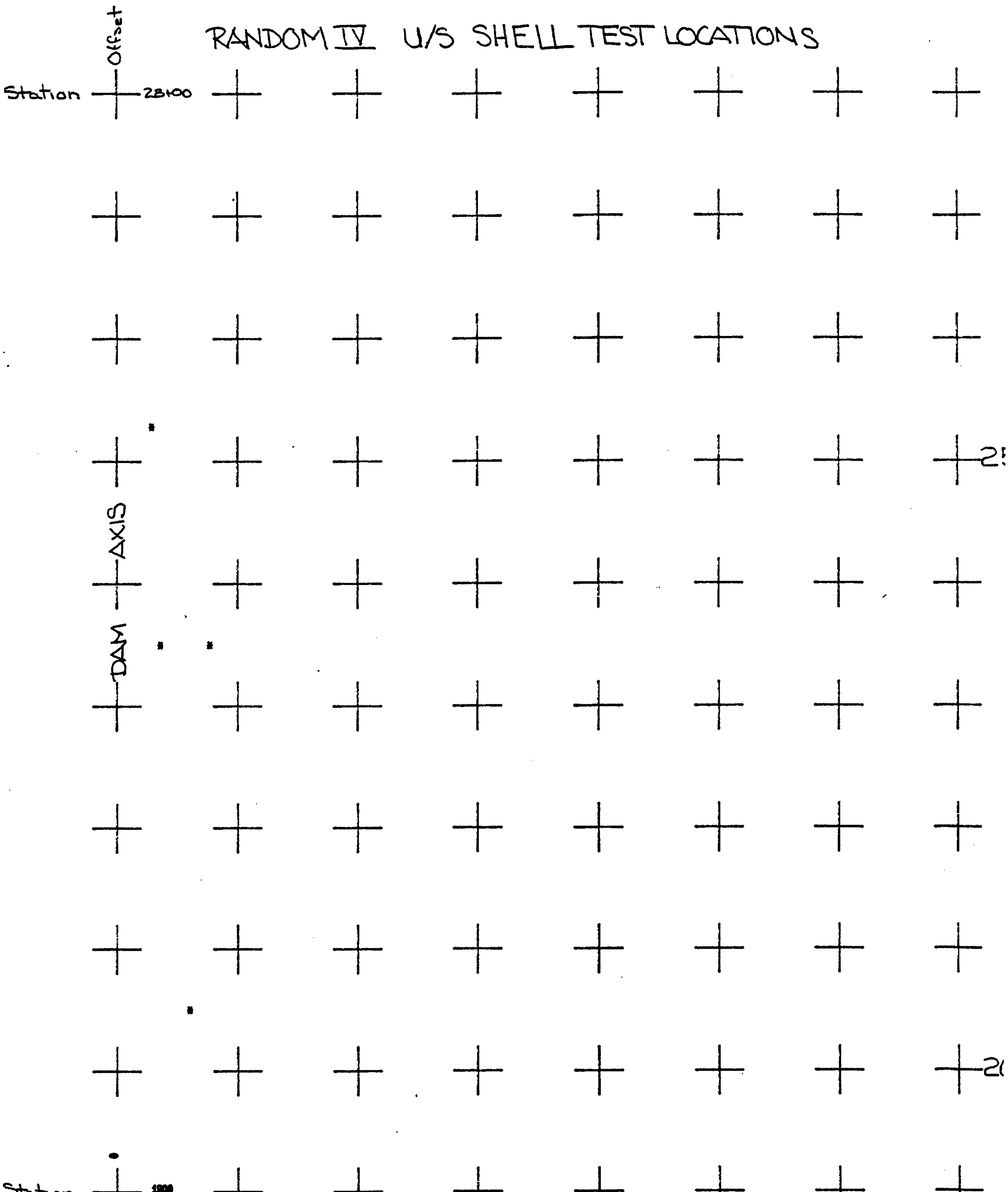

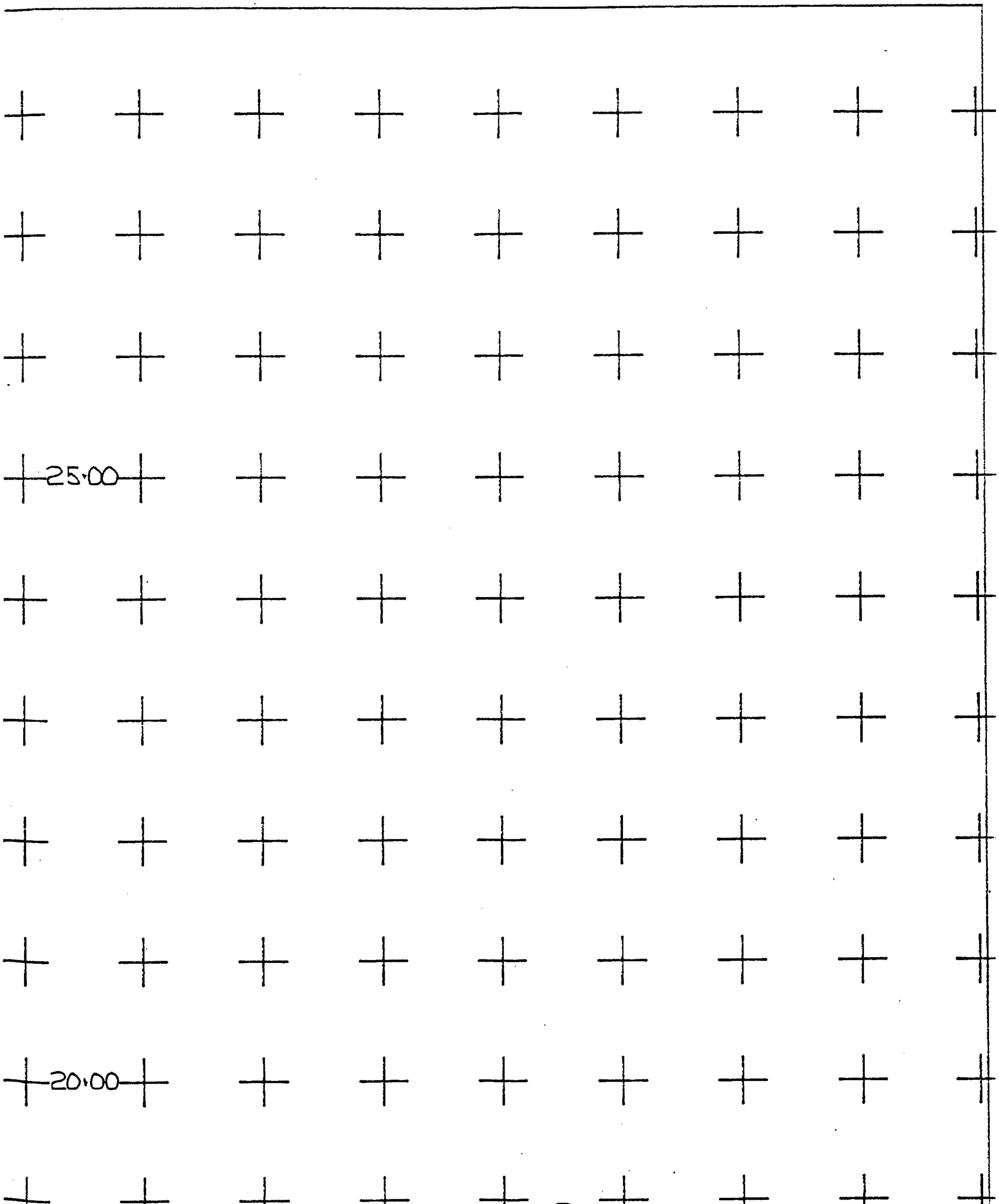
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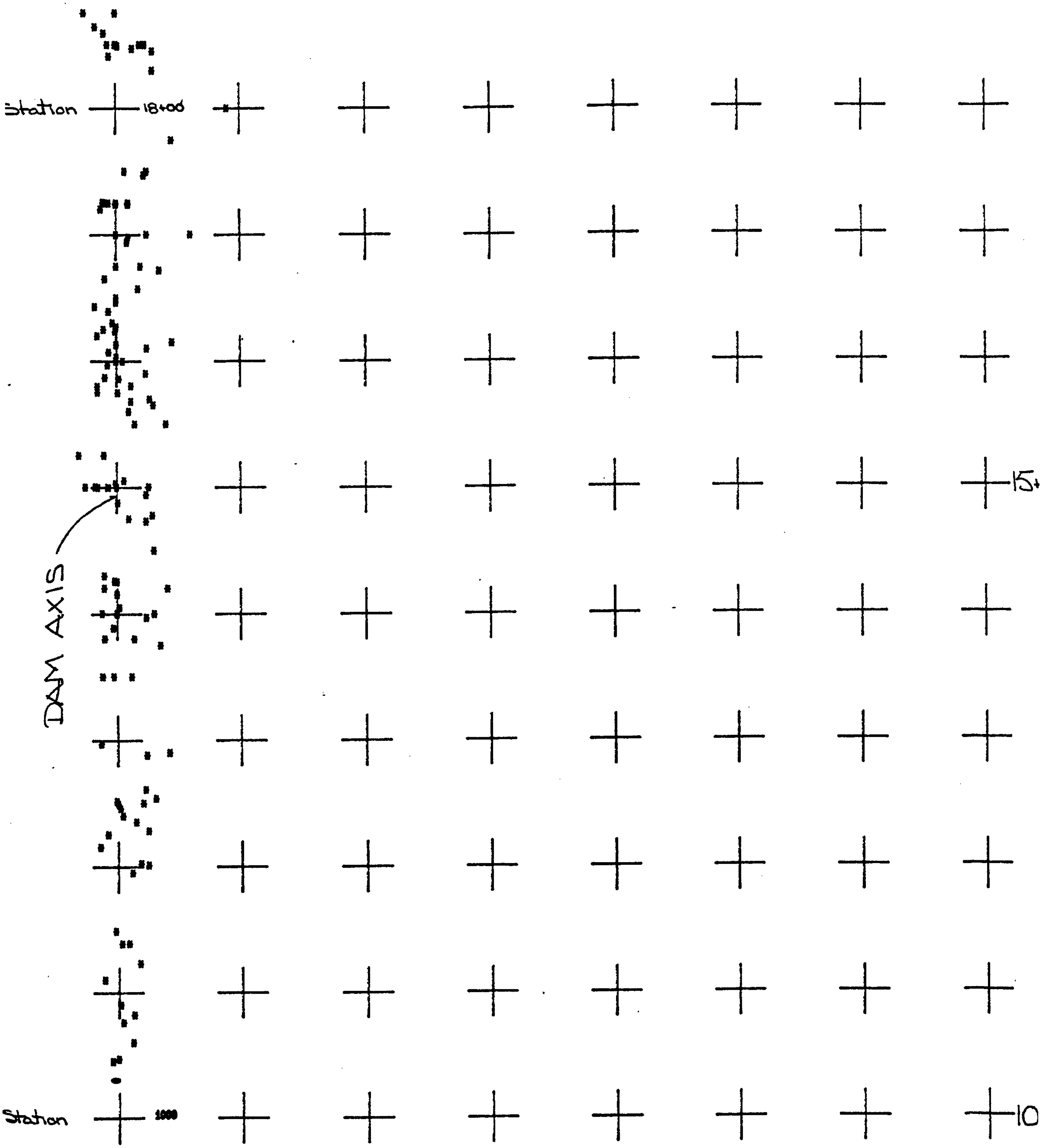
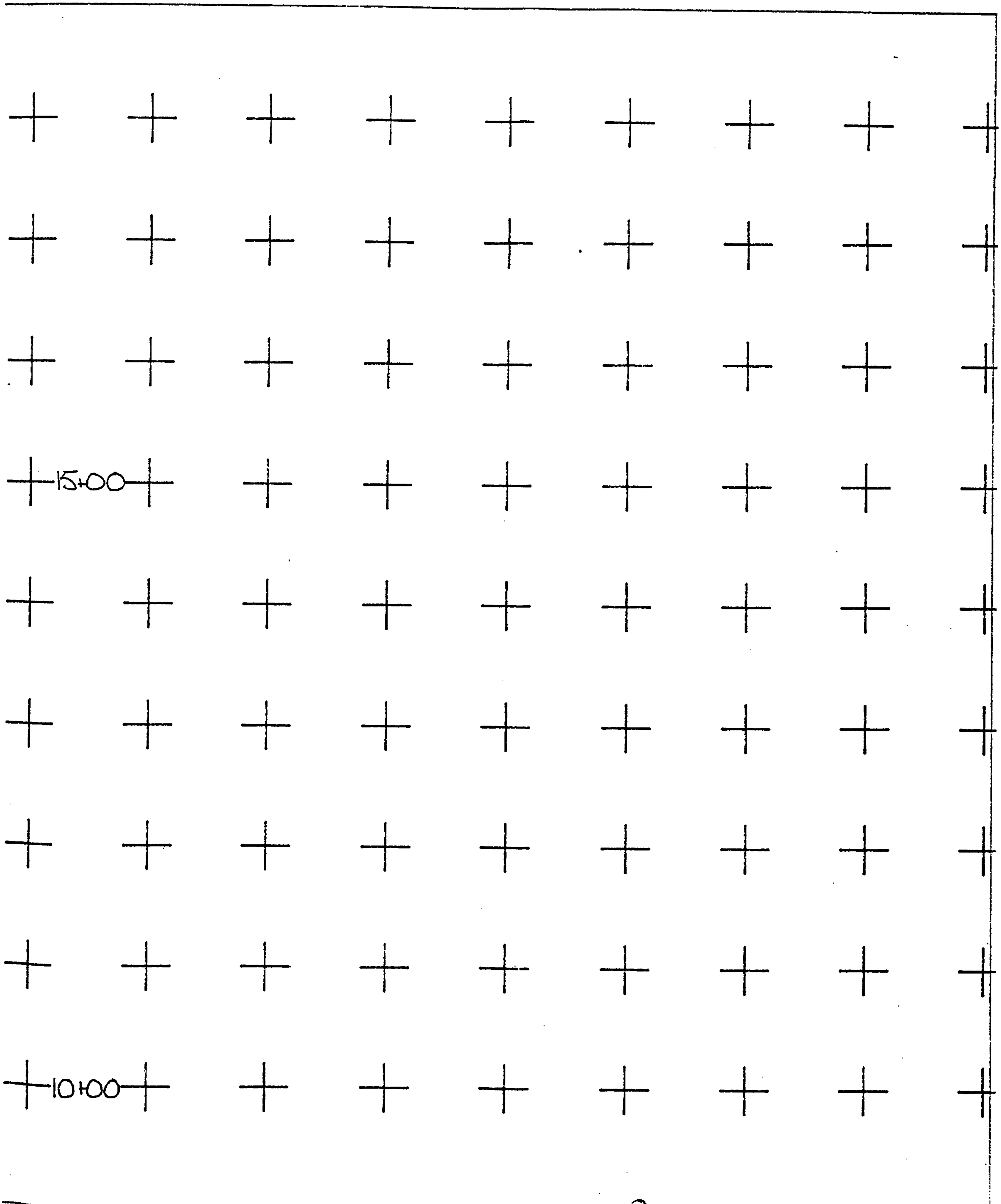


IMPERVIOUS CORE TEST LOCATIONS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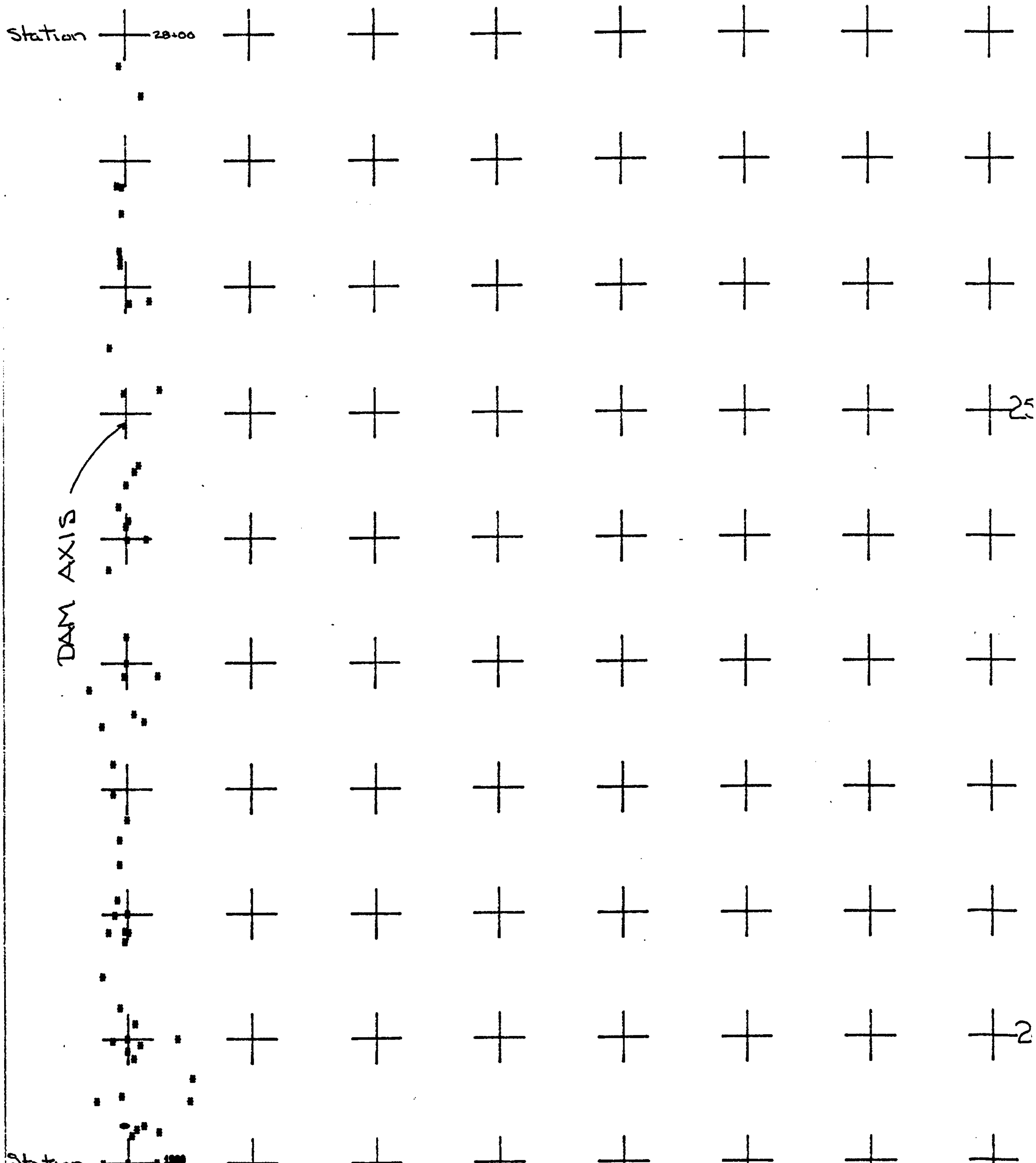
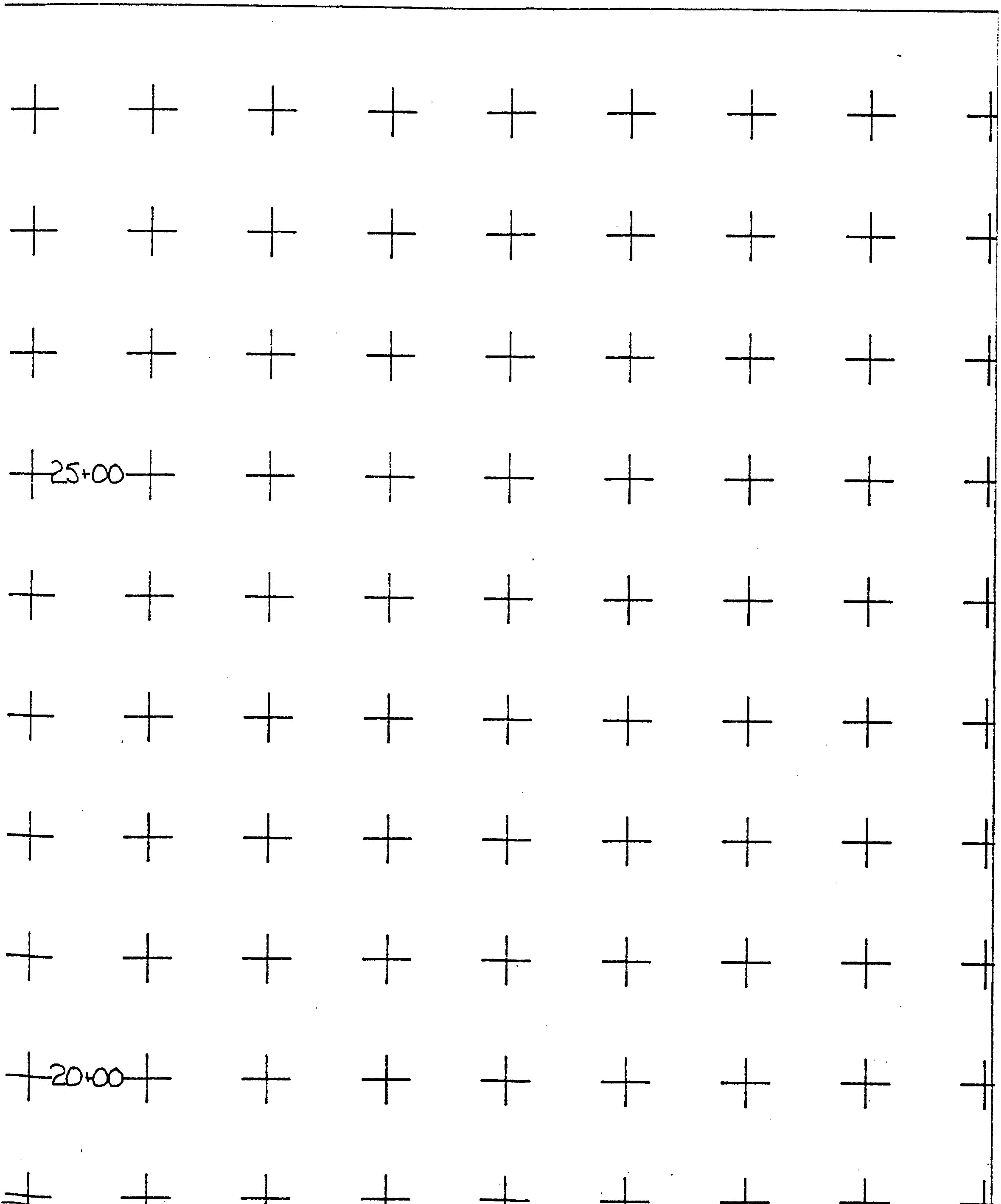
IMPERVIOUS CORE TEST LOCATIONS

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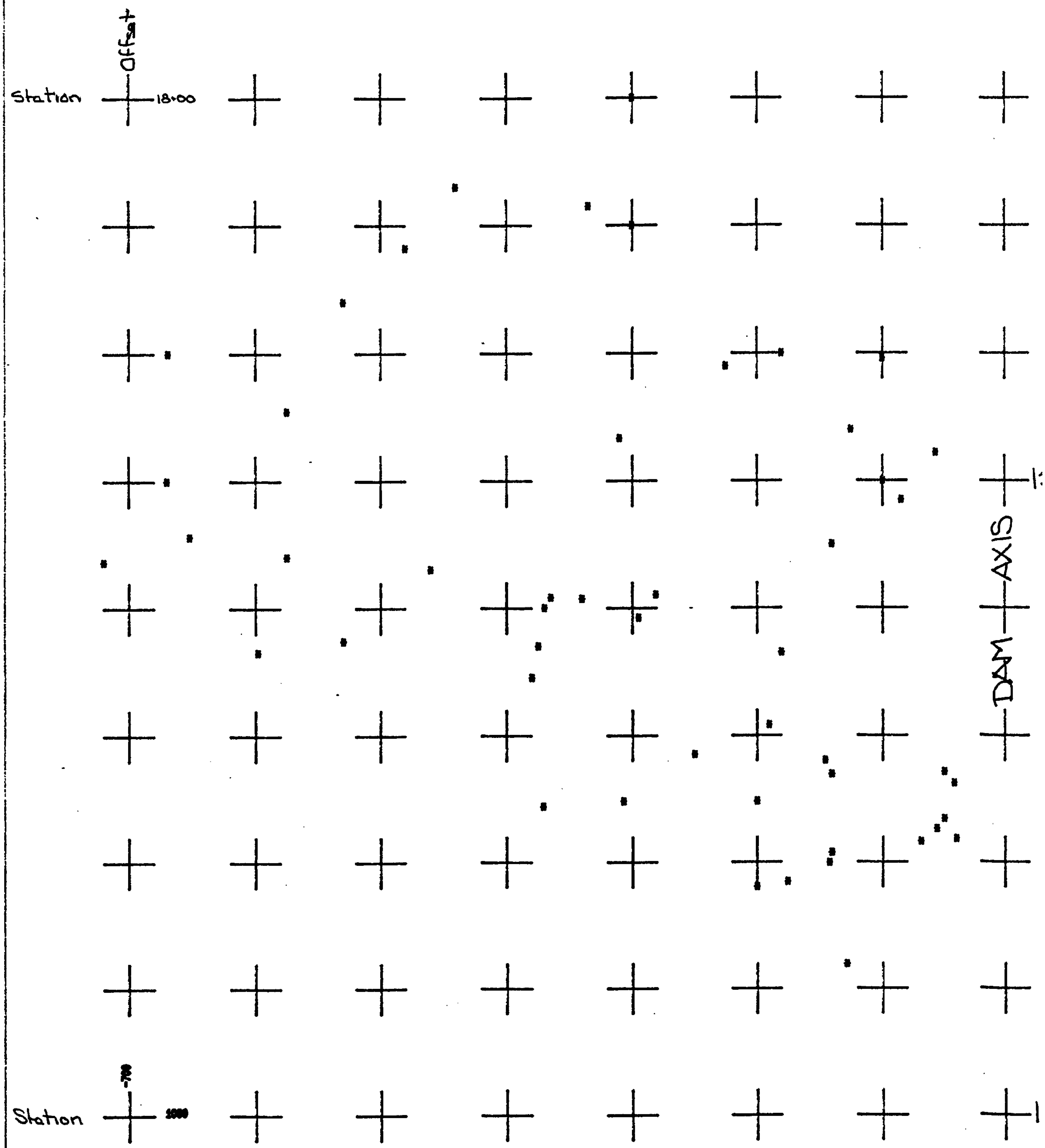
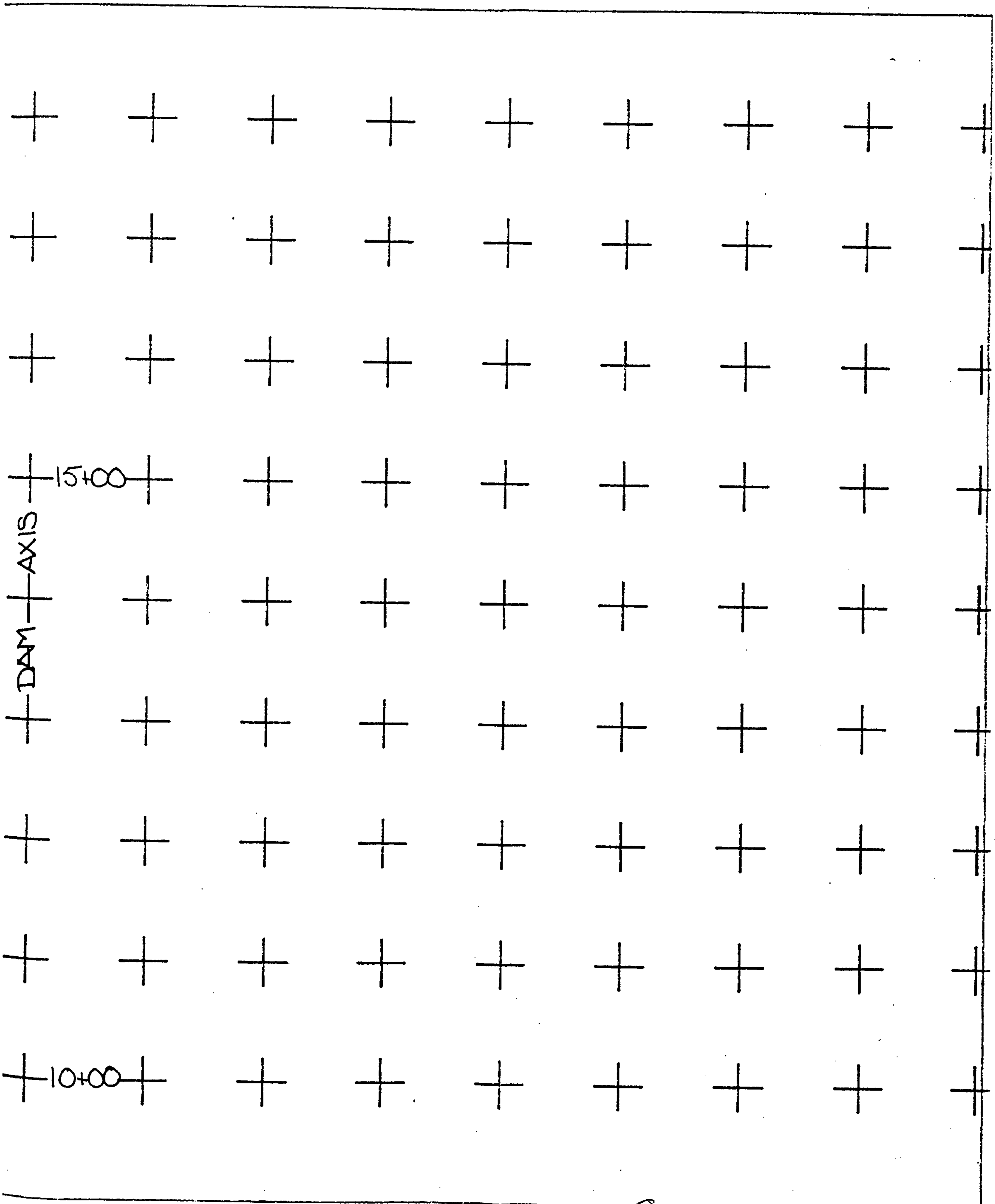


TRANSITION I D/S SHELL TEST LOCATIONS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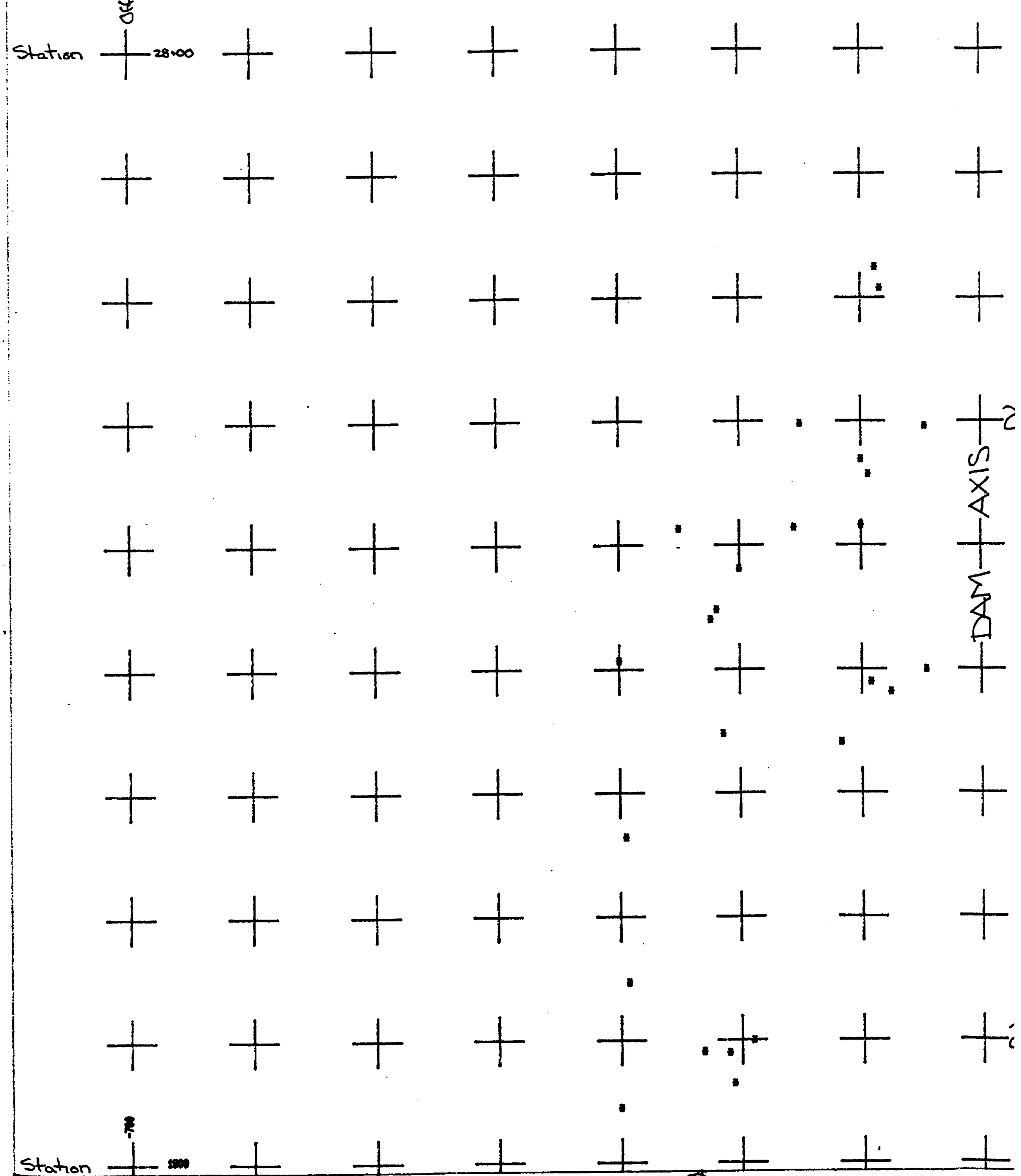

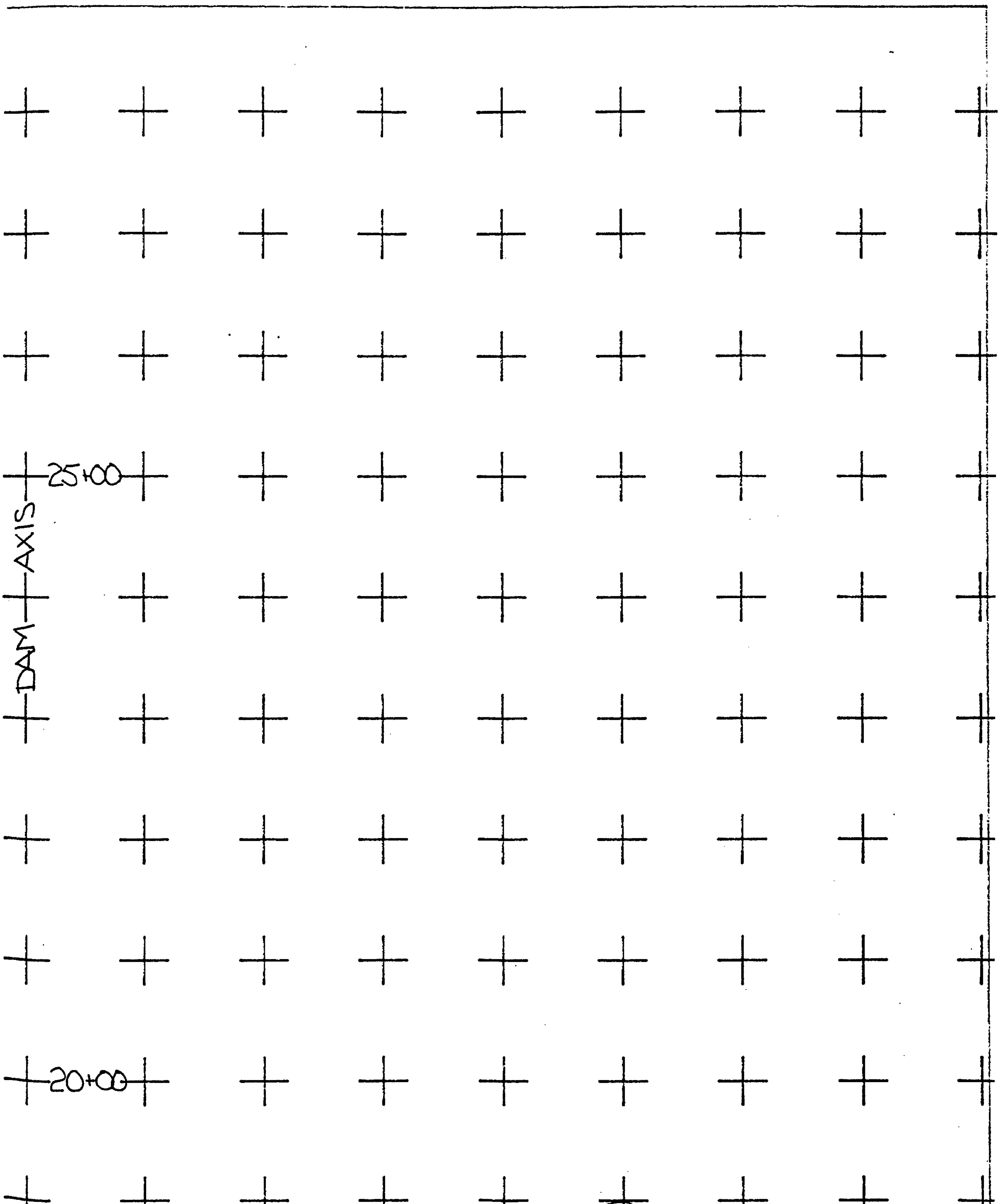
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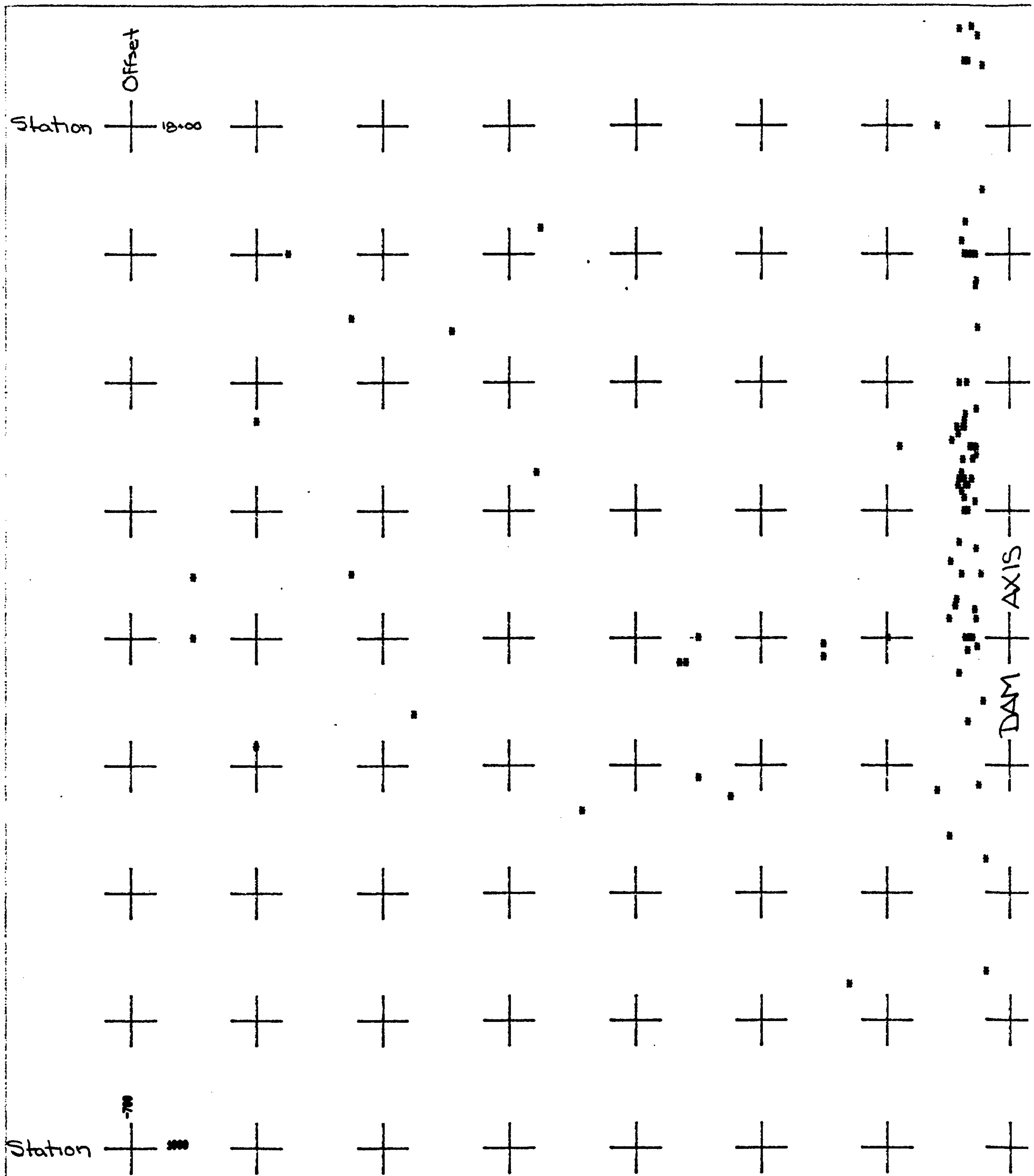

Offset

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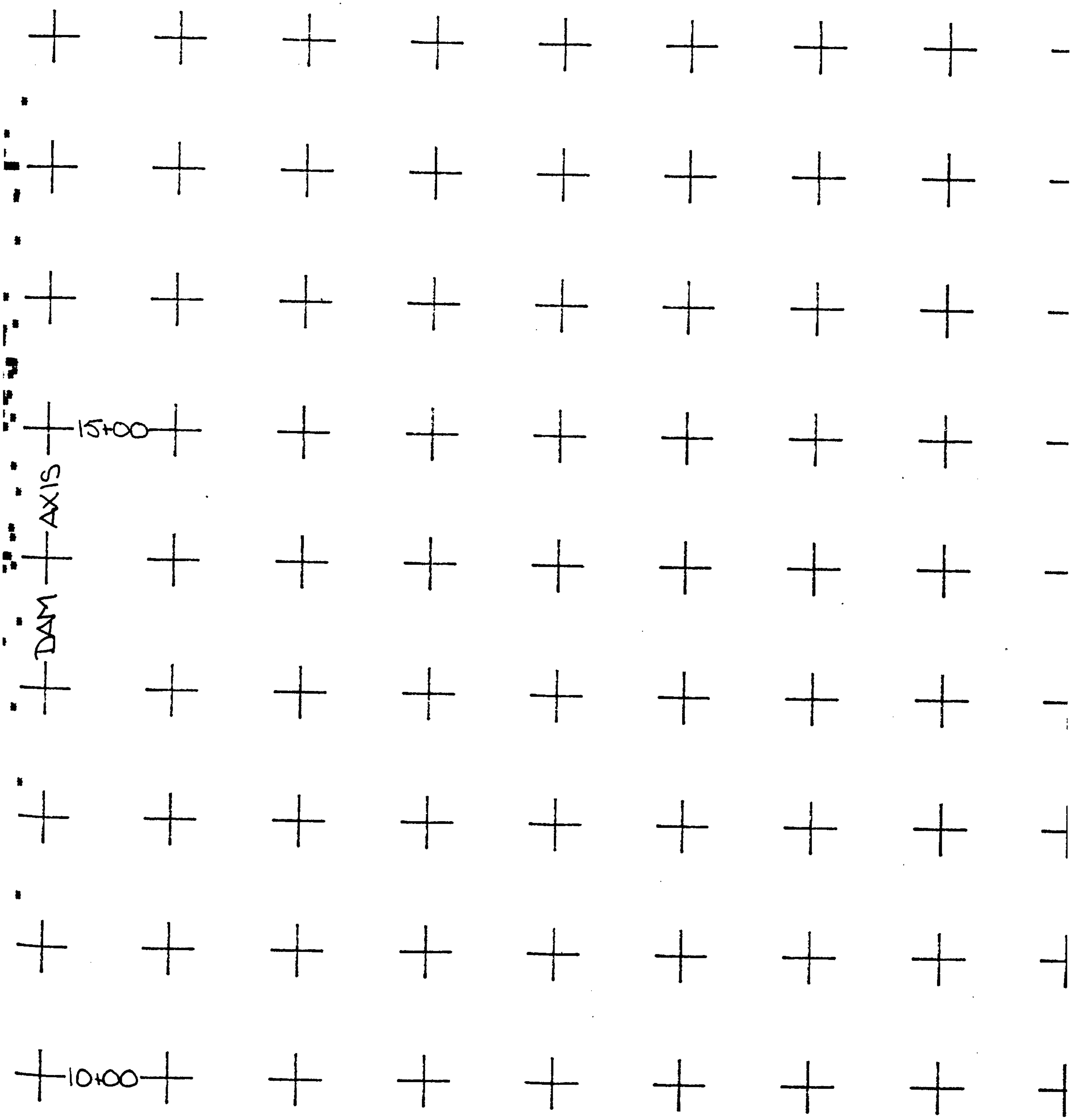
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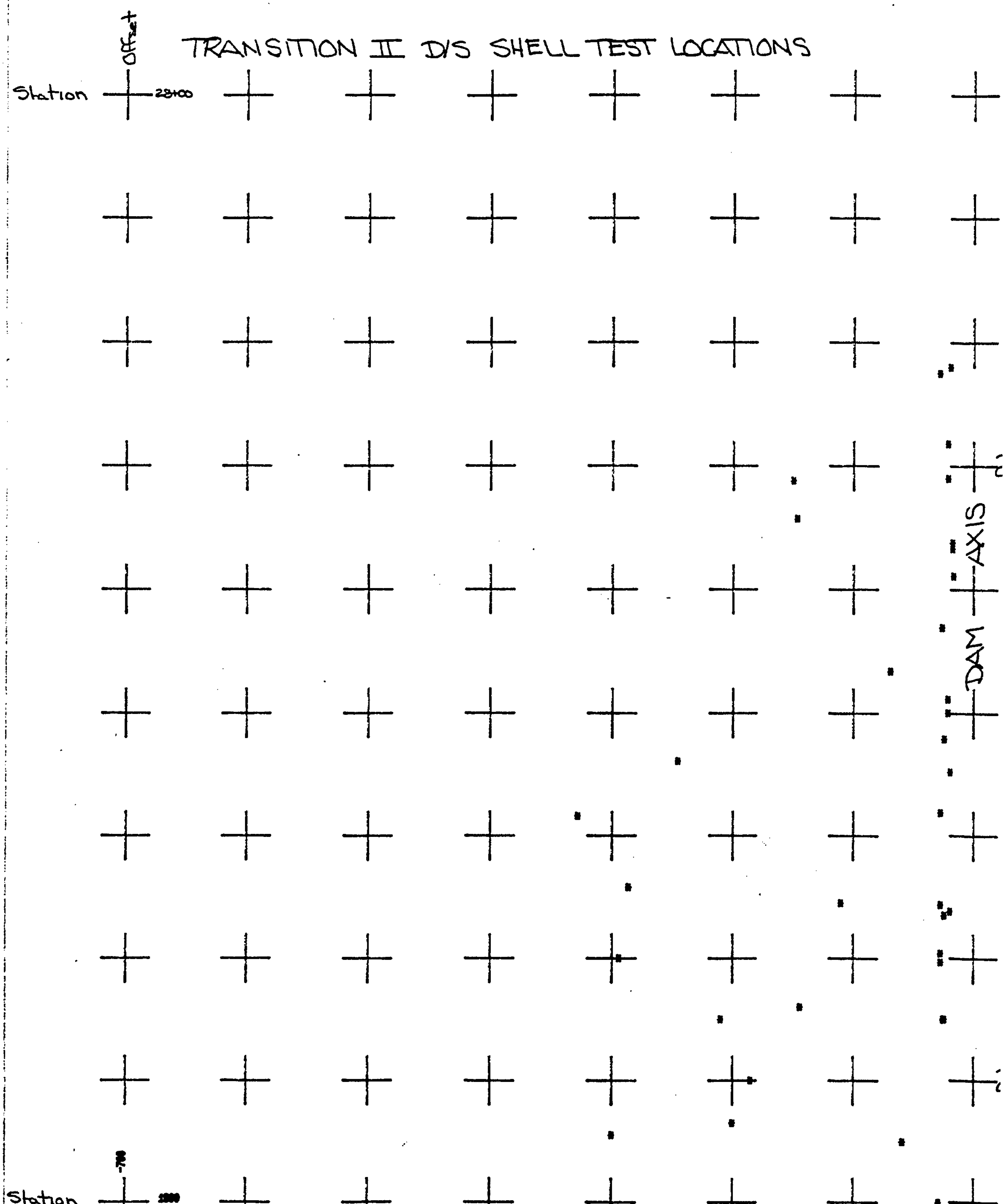

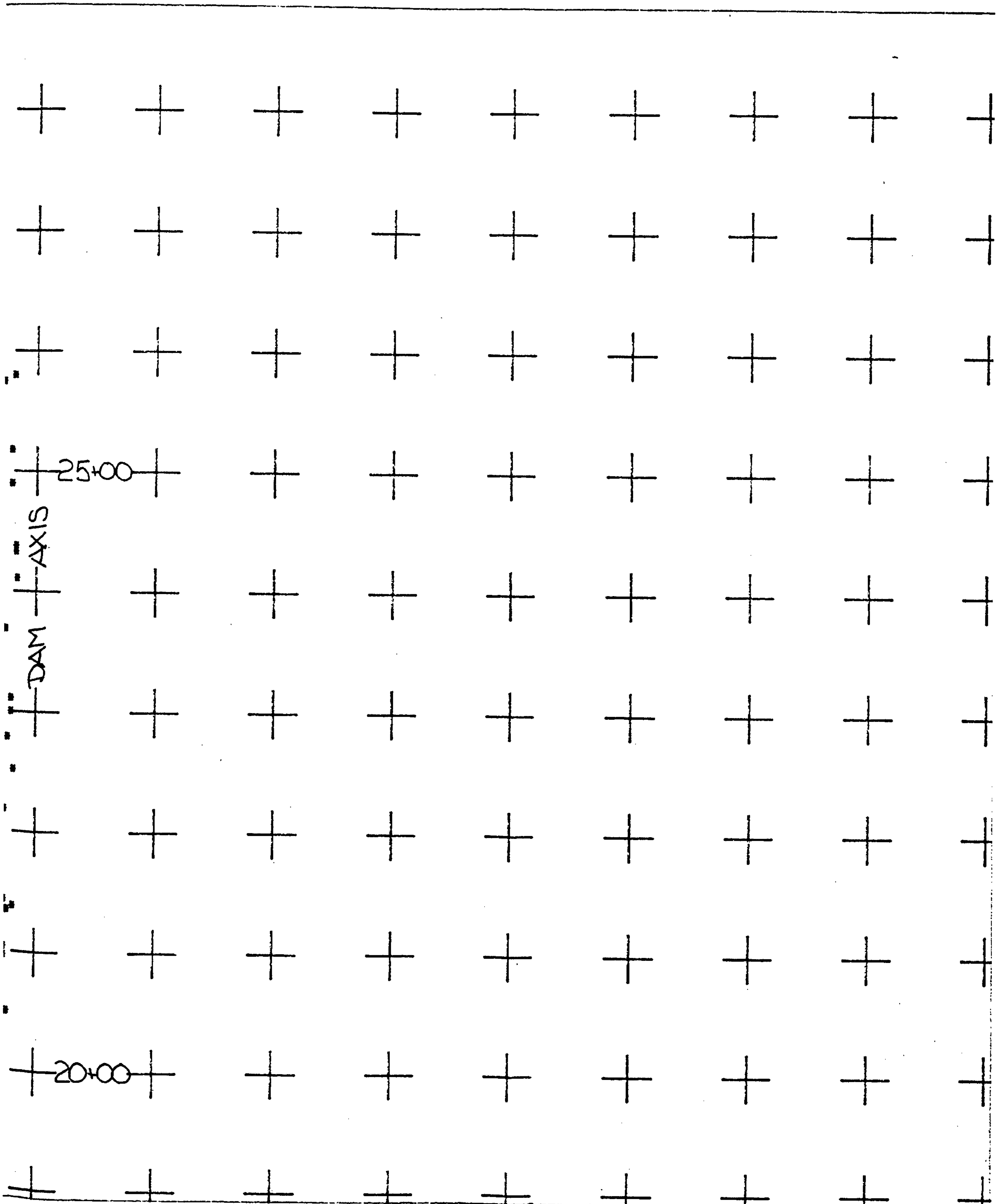
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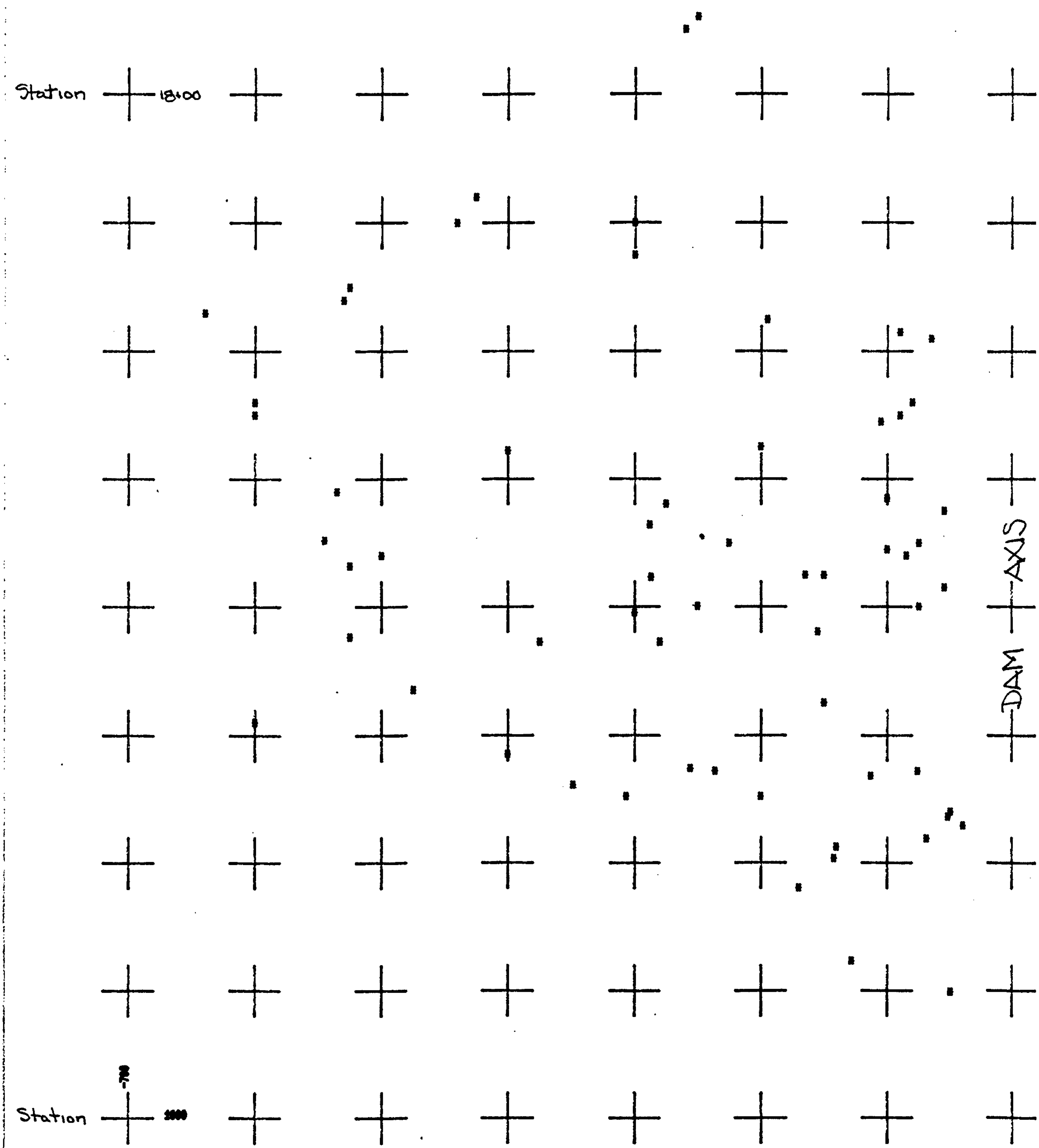
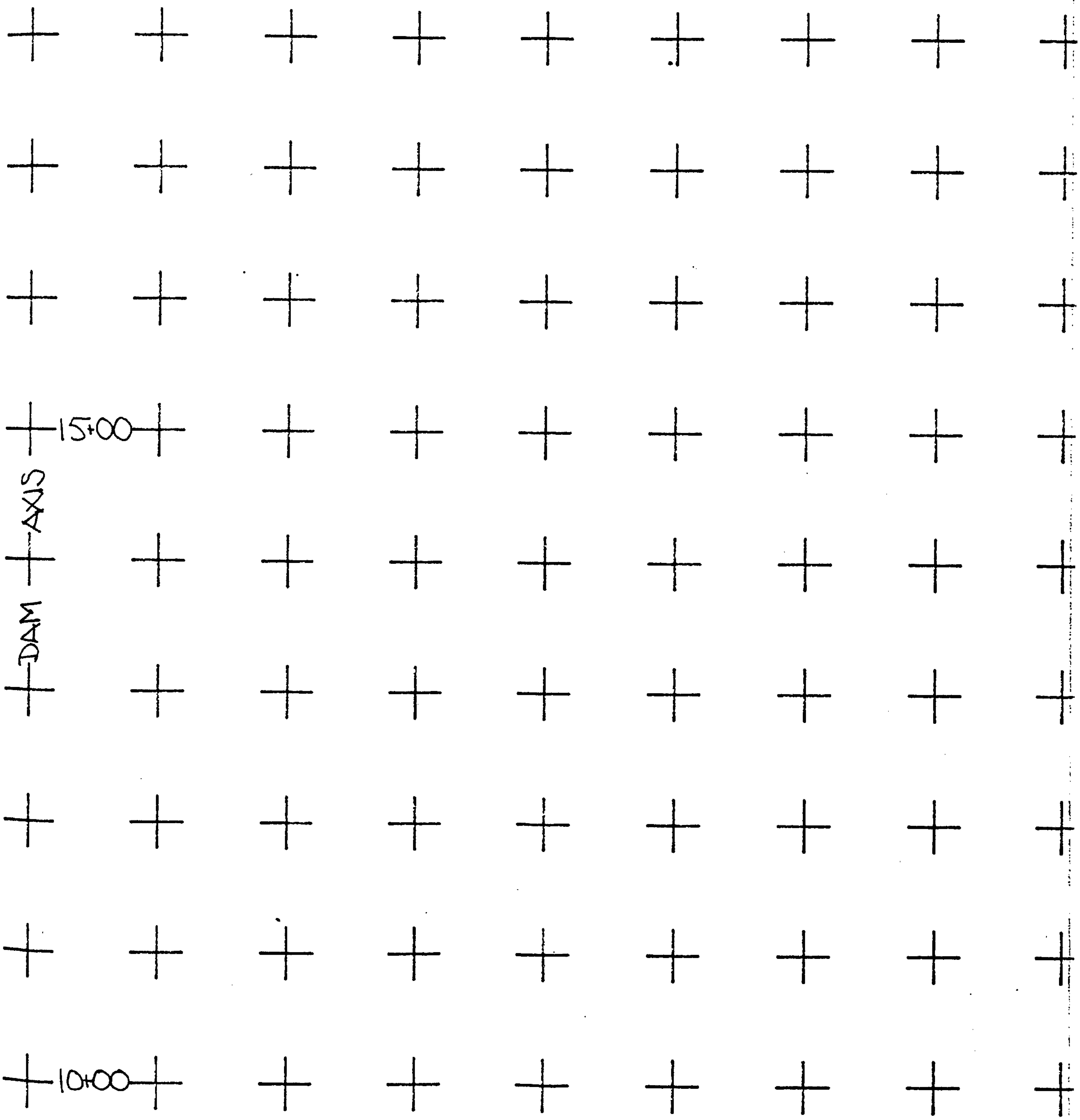


DRAINAGE FILL I D/S SHELL TEST LOCATIONS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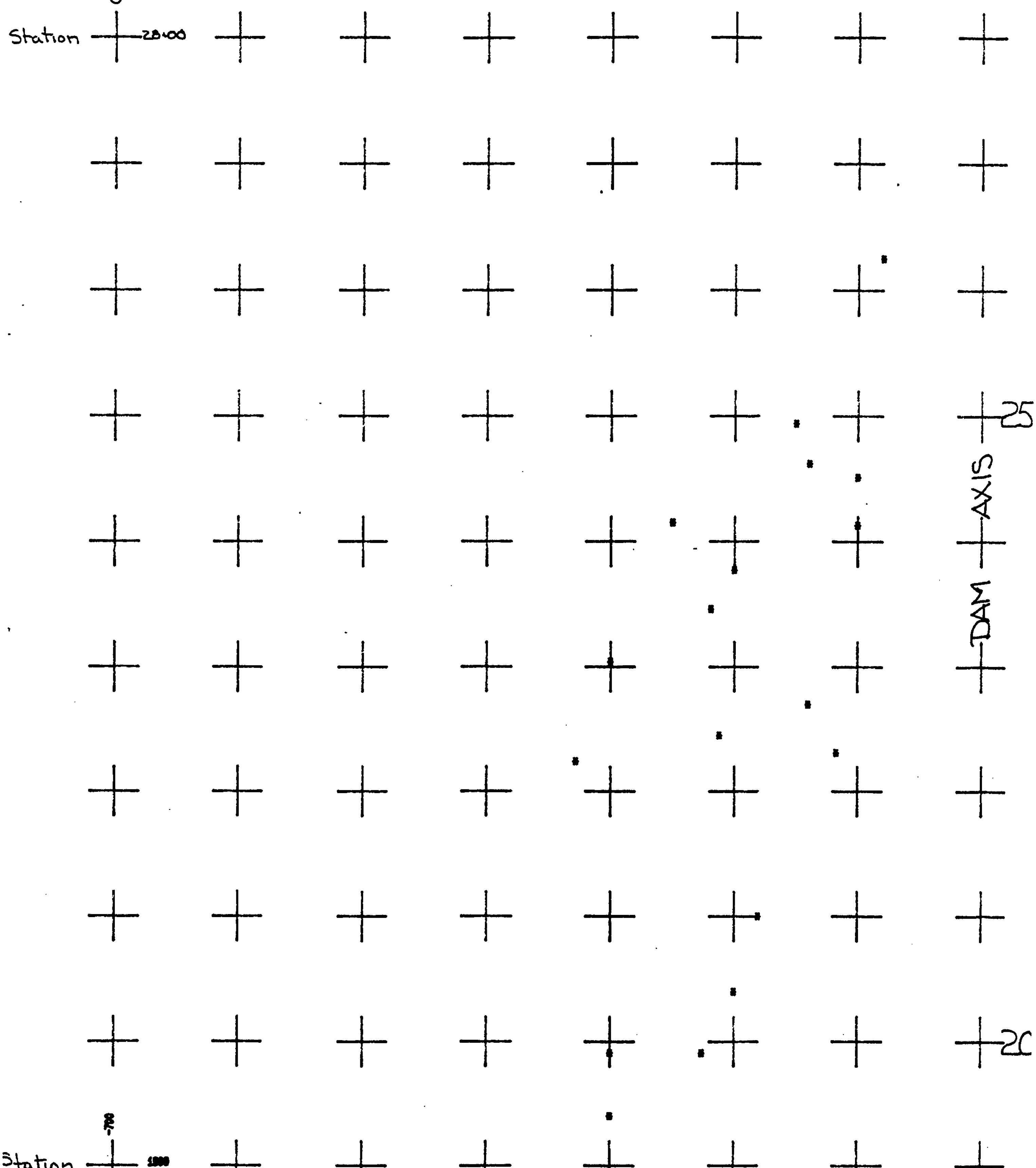

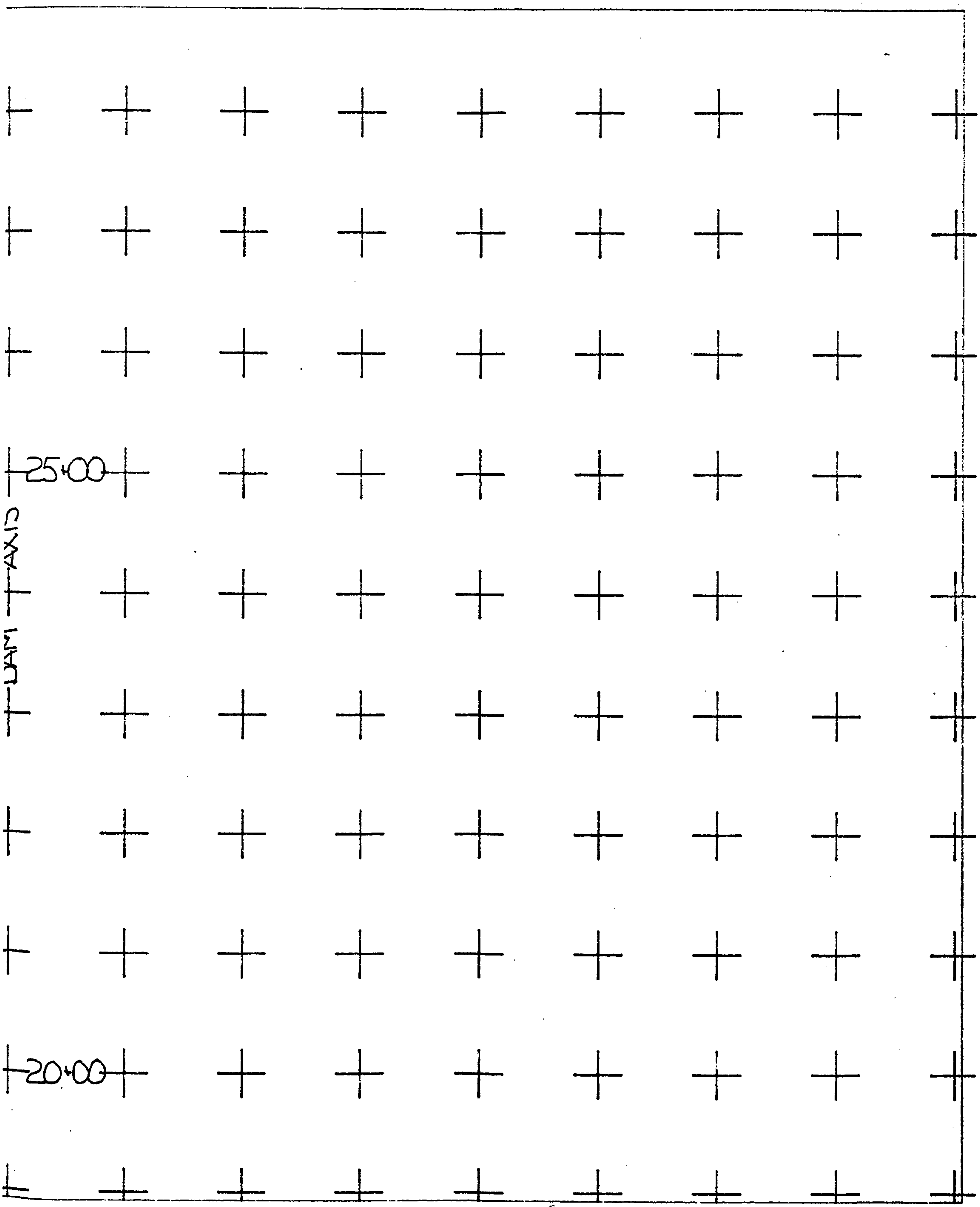
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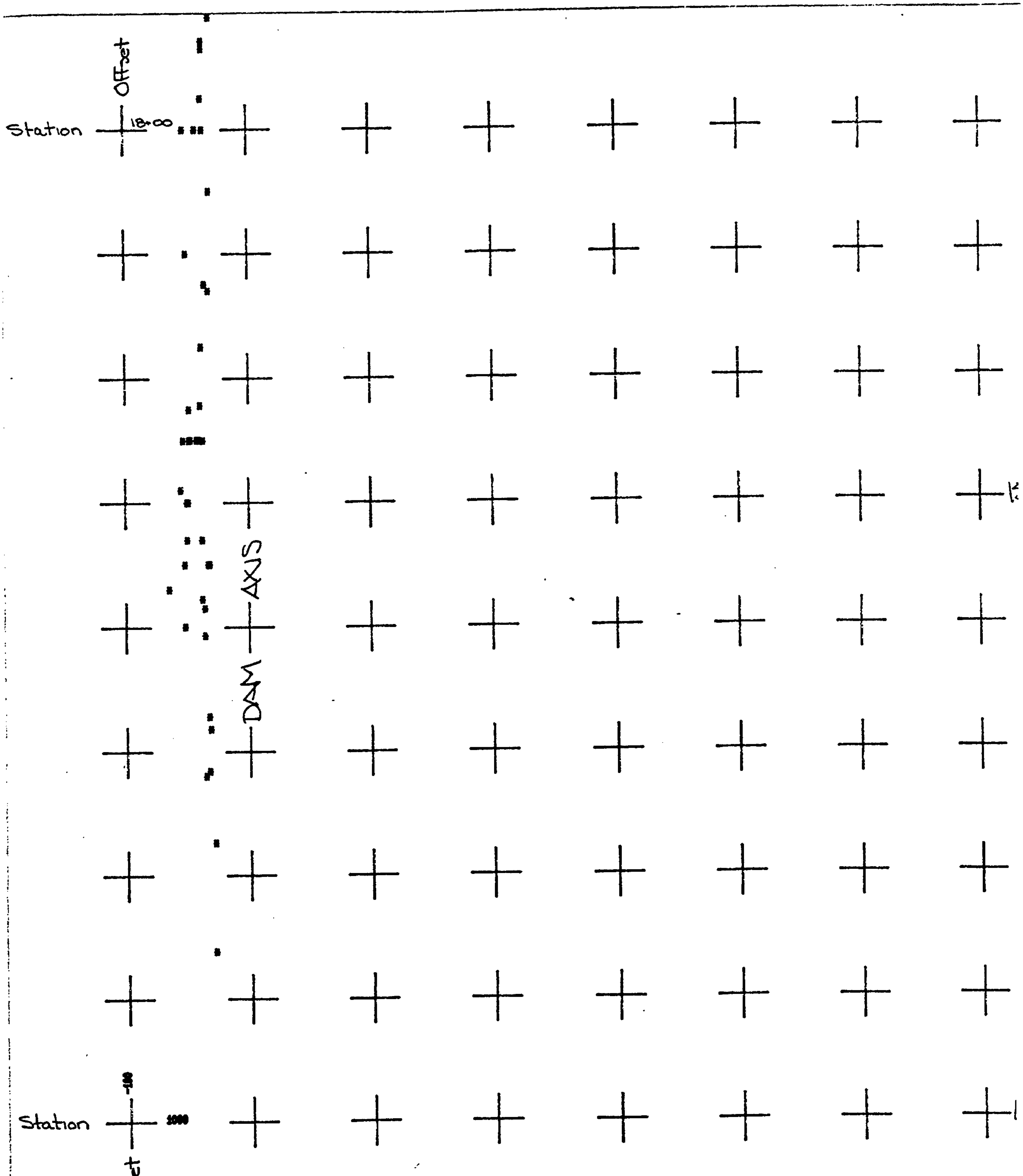

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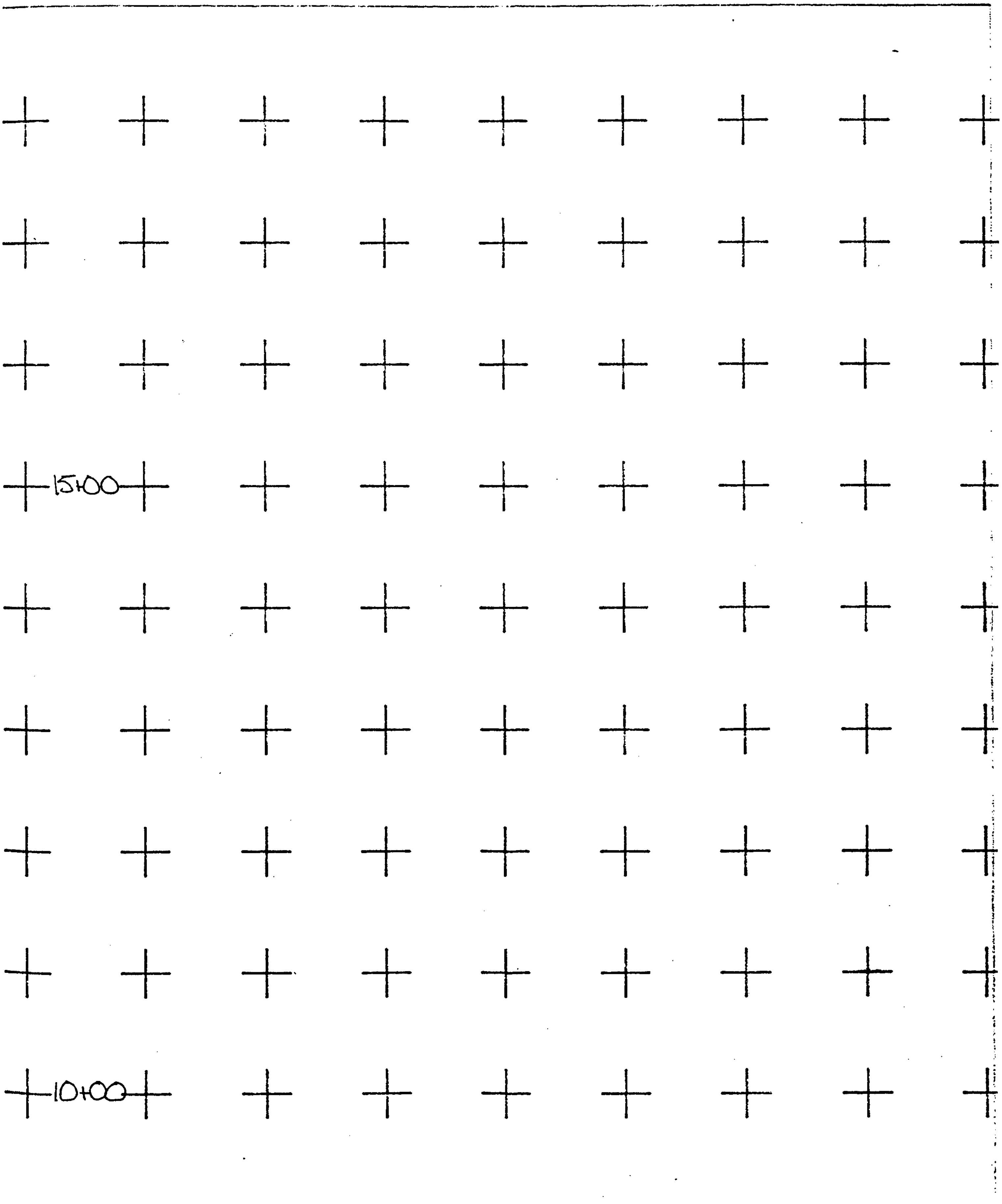
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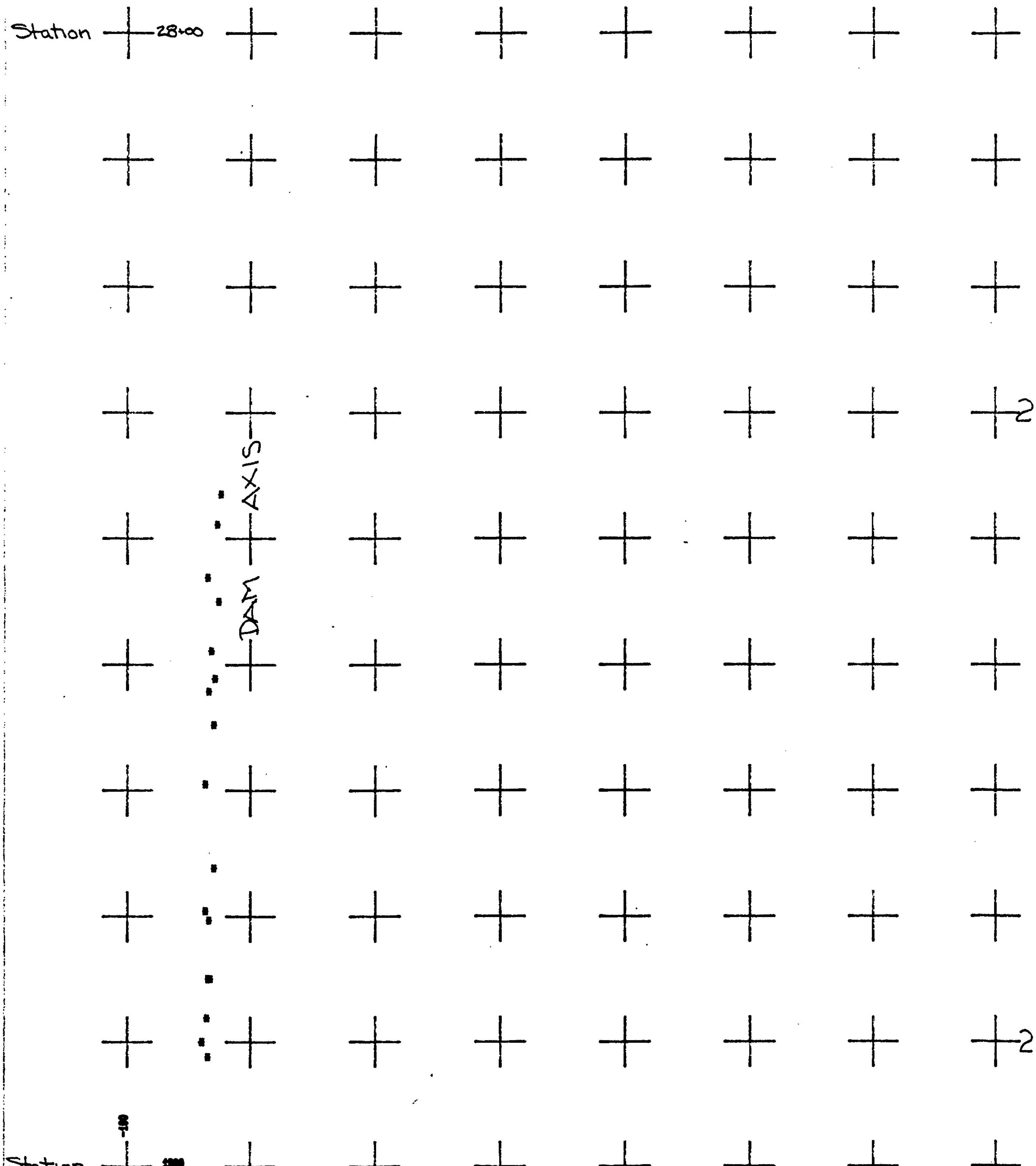

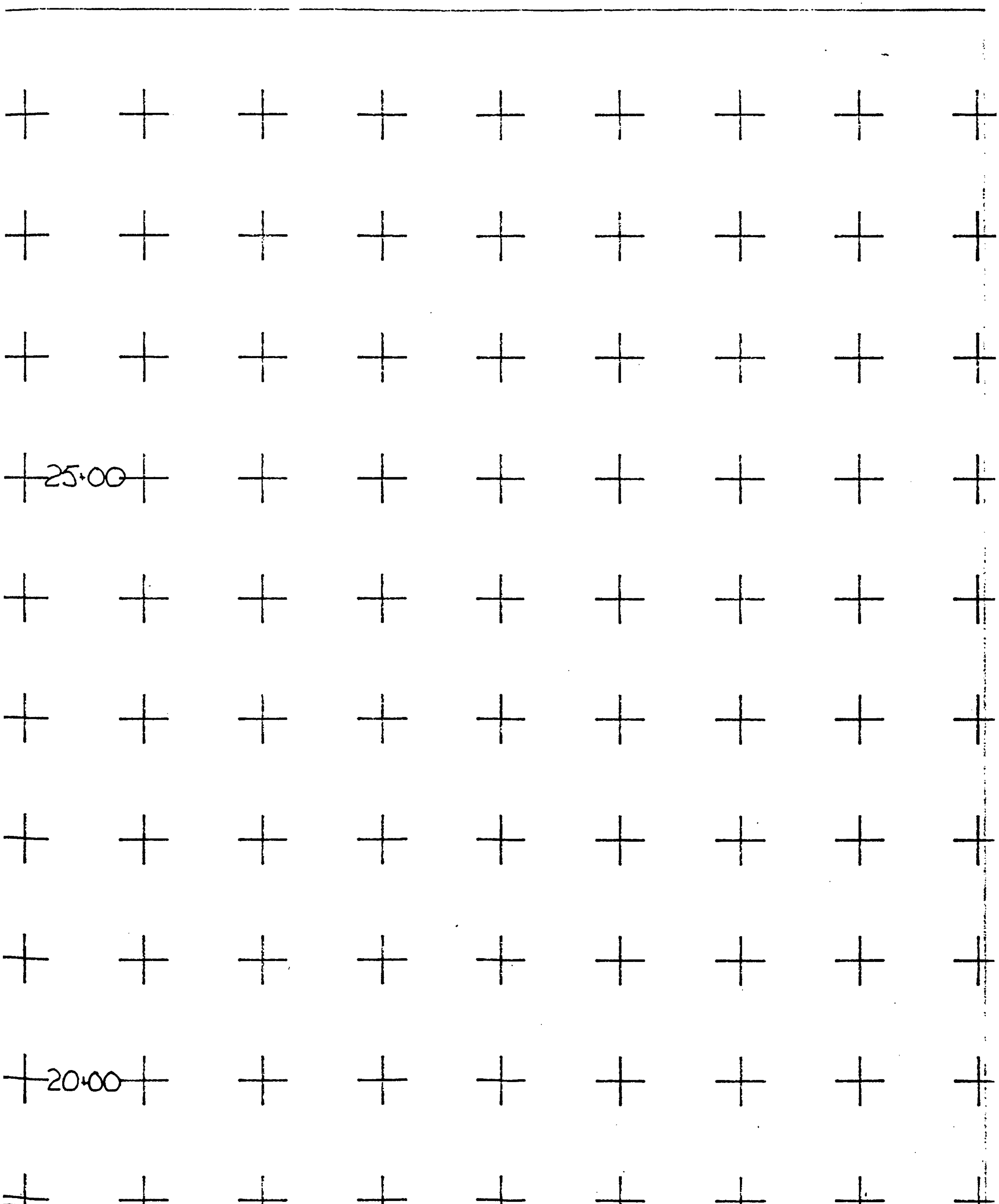
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